Chapter 4. Current Program Activities

Fish Passage Improvement at DWR

The Department of Water Resources has been implementing fish passage improvement projects and studies through its divisions and districts as well as through its Fish Passage Improvement Program. DWR has contributed engineering feasibility and environmental documentation and permitting services to a number of projects in the state. Table 4-1 lists projects of the Fish Passage Improvement Program and Table 4-2 lists fish passage projects of other DWR divisions or districts. All of the projects involve DWR in a variety of roles with other public or private participants.

The following project descriptions are organized by area. Figure 25 shows the locations of all project structures. Figures 26, 27, and 28 locate all inventoried structures in relation to critical habitat established for winter and spring-run Chinook salmon and Central California Coast and Central Valley steelhead ESUs, an important Level I criteria for project selection. Figures 29 through 32 show program areas with locations of projects and other inventoried structures.

Fish Passage Improvement Program Projects

The Fish Passage Improvement Program has identified 17 projects to support (Table 4-1), encompassing 120 structures. Some projects are under way with contributions, such as engineering design, from other divisions within the state Department of Water Resources (DWR), and coordination from such agencies as the U.S. Bureau of Reclamation (USBR) and state Department of Fish and Game (DFG). The Fish Passage Improvement Program recently has initiated or has taken the lead in coordinating other projects. The projects in Table 4-1 meet Level I and several Level II criteria and are identified by the CALFED Ecosystem Restoration Program (ERP) or by DFG or by the U.S. Fish and Wildlife Service (USFWS) for remediation. The Fish Passage Improvement Program has identified some as new opportunities that support the goals of the CALFED ERP. They include dams, road crossings, culverts, pipelines, bridge aprons, and gravel pits.

Other DWR Divisions and Districts

Table 4-2 lists fish passage improvement projects conducted by other DWR Divisions or Districts through other sources of funding.

Northern District

Northern District is providing engineering planning and design services to several projects including Clough Dam on Mill Creek, Iron Canyon and Bear Hole on Big Chico Creek, and dams on Battle Creek as part of the Battle Creek Salmon and Steelhead Restoration Project.

Central District

Central District provided preliminary design for a fishscreen at the Hallwood-Cordua Irrigation diversion just upstream of Daguerre Point Dam.

San Joaquin District

San Joaquin District is providing environmental and engineering planning and design services to several projects including San Clemente Dam on the Carmel River, the Magneson Pond Isolation Project, the Milburn/Hansen Restoration Project on the San Joaquin River, and the Ratzlaff, Stone, and Robinson sites of the Merced River Salmon Habitat Enhancement Project on the Merced River.

Table 4-1. Priority projects of the Fish Passage Improvement Program that meet Level I and Level II criteria

Table 4-2. Fish Passage Projects of Other DWR Divisions or Districts.

Figure 45. Fish Passage Improvement Program Locations of Structures in Streams and Priority Structures

Figure 46. Critical Habitat for Winter-run Chinook Salmon and Locations of Structures in Streams

Figure 47. Critical Habitat for Spring-run Chinook Salmon and Locations of Structures in Streams

Figure 48. Critical Habitat for Central Valley and Central California Coast Steelhead ESUs and Locations of Structures in Streams

Figure 49. Fish Passage Improvement Program Sacramento River and Tributaries

Figure 50. Fish Passage Improvement Program Lower Sacramento River and Delta Tributaries

Figure 51. Fish Passage Improvement Program San Joaquin River and Tributaries

Figure 52. Fish Passage Improvement Program Bay Area and Delta

Division of Environmental Services

The Environmental Services Office is evaluating fish passage at a seasonal check dam and road crossing in Putah Creek as part of its ongoing participation in floodplain studies and habitat enhancements in the Yolo Bypass; evaluating fish passage at Fremont Weir in the Yolo Bypass; and developing a study at Lisbon Weir in the Yolo Bypass Toe Drain to collect fish passage data for a Through-Delta-Facility proposed by CALFED.

Upper Sacramento River and Tributaries

Battle Creek – Shasta and Tehama Counties

The Battle Creek Salmon and Steelhead Restoration Project will open 48 miles of prime salmon and steelhead habitat on the mainstem and north and south forks of Battle Creek and its tributaries. The project will restore winter-run, spring-run, fall-, and late-fall Chinook salmon and steelhead in one of the most important anadromous fish spawning streams in the Sacramento Valley, while maintaining the resource for electricity customers of California. The project will:

- Remove five dams (Wildcat Dam on North Fork Battle Creek, Coleman and South Diversion Dams on South Fork Battle Creek, Lower Ripley Creek Diversion Dam on Ripley Creek, and Soap Creek Diversion Dam on Soap Creek)
- Install fish screens and ladders at three other diversion dams (Eagle Canyon, North Battle Creek Feeder, and Inskip diversion dams)
- Reconfigure various tailrace and penstock bypasses to ensure the use of a hydroelectric project under all conditions while meeting various instream biological criteria.

The project also includes a substantial increase to minimum instream flow requirements established under the Federal Energy Regulatory Commission license and sets new flow-ramping rate criteria. In addition, where dams are being removed, PG&E is transferring its diversion water rights to the state Department of Fish and Game to be dedicated for instream use.

Two funds also have been established. A $3 million Water Acquisition Fund established within the U.S. Bureau of Reclamation allows for the purchase of additional water over 10 years after the project is completed. It would be used if more water is necessary to restore fishery resources. The fund can be used to buy permanent additional water rights or it can be used to buy additional water on a one-time basis, such as during a drought.

Friends of the River

Coleman Dam

Also, a $3 million Adaptive Management Fund has been created from a Packard Foundation grant. The U.S. Fish and Wildlife Service and The Nature Conservancy administer it. A team of representatives from government resource agencies and PG&E is formulating an Adaptive Management Plan that sets criteria and mechanisms to track the success of the project and allows for funds to modify the project to ensure its success over the life of the FERC license. The team using adaptive management will continue to evaluate and modify the project after construction. The project involves state and federal government resource agencies and PG&E. It is also coordinated through landowners, the Battle Creek Watershed Conservancy, and the Battle Creek Working Group, a multiagency and private-sector group that includes state and federal agencies, PG&E, power interest groups, urban and agricultural water agency associations, and ocean and sport fishing interests. Construction was to have started in the summer of 2002. Total cost for dam removals, fish ladders and screens, and bypass tunnels is more than $22.5 million. The project is moving forward under an alternative FERC license amendment process specifically approved for it. It is a hybrid of the traditional license amendment process and the collaborative process FERC has established for license renewal applications.

USFWS and USBR are planning additional fish passage improvement projects as part of the Coleman National Fish Hatchery (CNFH) reevaluation, to integrate CNFH operations with the restoration of the Battle Creek watershed. Plans to improve the CNFH water-supply intakes identify several alternatives. The USFWS Anadromous Fish Restoration Program identified construction of a tailrace barrier downstream of PG&E's Coleman Powerhouse as a high priority. It said the tailrace falsely attracts adult salmon and steelhead to an area that has very poor spawning habitat. Construction of a tailrace barrier has been linked to alternatives for CNFH water-supply intake changes. Preliminary designs for the barrier and intake modifications have been completed; and construction funding is being sought. In addition, the USFWS has received a 1999 Calfed grant of $1,633,400 to modify the CNFH barrier weir so that it more effectively blocks fall and late-fall chinook passage past CNFH, and improve the upstream fish ladder in the barrier weir to meet the same criteria that will be applied to the improved hydropower facility ladders in Battle Creek.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?
CNFH Barrier weir	6.0			Concrete weir	Pool and weir fish ladder	Ladder is closed Sept. through early March
CNFH Intake #3 Diversion	7.2			Concrete weir	Pool and weir fish ladder	Yes
Coleman Powerhouse tailrace (Intake #1)	7.6	NA		Concrete weir		Temporary fish barrier exists at bottom of tailrace to block access; plans for permanent barrier.
Wildcat Dam (North Fork)	2.4	8	15	Masonry dam	Pool and weir fish ladder	Passable only at certain flows
Eagle Canyon (North Fork)	5.1	15	70	Masonry dam	Alaska steep pass fish ladder	Intentionally closed

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?
North Battle Creek Feeder Diversion Dam (North Fork)	9.2	8	93	Masonry dam	Alaska steep pass fish ladder	Passable only at certain flows
Coleman Diversion Dam (South Fork)	2.5	13	75	Masonry dam	Alaska steep pass fish ladder	Intentionally closed
South Diversion Dam (South Fork)	13.9	15	100	Masonry dam	Denil fish ladder	Passable only at certain flows
Inskip Diversion (South Fork)	8	28	80	Masonry dam	Alaska steep pass fish ladder	Passable only at certain flows
Lower Ripley Creek Diversion Dam	1	5	44	Concrete dam	None	No
Soap Creek Diversion Dam	1	10	41	Concrete dam	None	No

The upstream fish ladder in the CNFH barrier weir will play an important role in monitoring the success of the Battle Creek Salmon and Steelhead Restoration Project. It will allow returning salmon and steelhead to be counted and sampled for important demographic information such as run-timing, stock, size, and condition. Obtaining environmental compliance and permits began as Phase I of the project in June 2000. Award of the first contracts for construction is anticipated in summer 2003 with a goal of completing construction on all projects by 2005.

For more information, contact:

- Harry Rectenwald, DFG. (530) 225-2368. E-mail: HRectenw.@dfg.ca.gov
- Chris Wilkinson, DWR, (916) 651-9629. E-mail: cdw@water.ca.gov.
- David Gore, USBR. (916) 978-5308. E-mail: dgore@mp.usbr.gov.

Iron Canyon and Bear Hole Fish Passage Project, Big Chico Creek – Butte County

The Iron Canyon and Bear Hole Fish Passage Project will improve fish passage for spring-run Chinook salmon and steelhead trout past natural barriers in Big Chico Creek. The two projects, Iron Canyon and Bear Hole, are in Upper Bidwell Park, on city of Chico property. Twice in the past, the state Department of Fish and Game (DFG) trapped and hauled fish upstream past the barriers when flow conditions prevented passage. Changes are being considered that would improve upstream passage for anadromous fish over a greater range of flow conditions. DWR is under contract to the U.S. Fish and Wildlife Service to conduct a preliminary engineering investigation of alternative solutions to fish passage at the two sites. A technical report summarizing findings of the investigation includes preliminary design drawings, geologic and environmental documentation, and cost estimates for construction of alternatives.

DWR

Iron Canyon's worn concrete and collapsed floor

At Iron Canyon, a fish ladder with 17 small concrete weirs was built in the 1950s. The weirs were built to help fish ascend a 35-foot vertical climb through large boulders along a 270-foot horizontal stretch of creek. Numerous repairs have been made to the original weirs that are mostly founded on basalt boulders of various sizes. Concrete was poured between boulders in the floors to provide a sealed pool in some of the ladder sections. Some of these pool floors have collapsed or leaked over the years and have been repaired periodically. Numerous leaks occur along the base of pool walls at the contact points between concrete and basalt. A few concrete plugs (concrete bags and walls) have been added in the upper ladder section to seal leaking pools. Sections of the weirs and walls throughout the ladder have either partially blown out or are worn to expose rebar. The preliminary engineering investigation includes assessing the condition of the existing fish ladder and developing alternatives that include repairing the existing structures and constructing new structures.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?
Bear Hole	13.3	5	N/A	Natural barrier	No	Yes, but difficult at low flows
Iron Canyon	14.2	35	N/A	Natural barrier	Pool and weir fish ladder	Yes, but limited and difficult

Bear Hole is about a mile downstream from Iron Canyon. A natural constriction in the channel through the main passage route makes it difficult for fish to pass upstream. Altered hydraulic conditions at this site have caused a large drop in water surface elevation, making passage difficult at low flows. DWR's preliminary engineering investigation will identify alternatives to improve upstream fish passage past the constriction in the creek.

Organizations and agencies involved in the project include DWR, DFG, the National Marine Fisheries Service, USFWS, the Big Chico Creek Watershed Alliance, and the city of Chico. DWR, under a $125,000 contract with the USFWS, will complete its preliminary engineering investigation in 2001. Neither a preferred alternative nor funds for the final design and construction of the project has been found, but the project could be completed as early as summer 2002. For more information, contact:

- Paul Ward, Department of Fish and Game. (530) 895-5015. E-mail: pward@dfg2.ca.gov.
- Bill McLaughlin, DWR. (530) 529-7382. E-mail: williamm@water.ca.gov.

Butte Creek, Lower Butte Creek, Sutter Bypass – Butte County

DFG, Paul Ward

White Mallard Bottom Weir – Butte Creek

Extensive restoration of anadromous fisheries were performed in the Butte Creek watershed with the goals of enhancing fish passage, increasing natural salmon and steelhead production, and enhancing riparian habitat. Two project areas, Upper Butte Creek and Lower Butte Creek, have been the focus of fish passage improvement efforts over the past 10 years. These projects have been carried out by the Butte Creek Watershed Conservancy, Butte Creek Watershed Project, Lower Butte Creek Project, the Nature Conservancy, Ducks Unlimited, California Waterfowl Association, private diversion and landowners, federal and state resource agencies charged with fishery restoration, local water districts and county commissions, private individuals, reclamation districts, and a state university foundation.

Upper Butte Creek Watershed Project

DFG, Paul Ward

Weir 1, Sutter Bypass

Declines in anadromous fish populations in the Butte Creek watershed are attributed to inadequate instream flows, unscreened diversions, inadequate passage over diversion dams, entrainment and stranding of adult fish at agricultural return drains (outfalls), poor water quality, and poaching (DFG 1993a; CALFED 1999b). Numerous diversion structures including dams, siphons, canals, and weirs have been addressed in various projects since 1991. To date, over $21 million has been spent removing five dams –Western Canal Main, Western Canal East Channel, Point Four Diversion, McGowan Dam, and McPherrin Dam; installing or improving nine fish screens and ladders (including Parrott-Phelan Diversion, Durham Mutual Diversion, Adams Diversion, and Gorrill Diversion); acquiring 45 cfs of water for instream flows; installing 10 flow gaging stations; acquiring 146 acres of land; inventorying diversions; and performing 12 upper and lower watershed evaluations and 15 structure analyses. Appendix C has details for specific projects of the Upper Butte Creek Watershed Project.

Lower Butte Creek Project

DFG, Paul Ward

East-West Weir – Sutter Bypass

Lower Butte Creek encompasses Butte Sink south through the Sutter Bypass. Butte Sink is largely comprised of seasonally flooded wetlands and provides an important migratory pathway for Chinook salmon and steelhead that spawn in the upper reaches of Butte Creek. Butte Slough and Sutter Bypass are seasonal and permanent wetlands, and managed waterfowl habitats. The canals, sloughs,

and flooded lands here are also important migratory and nursery areas for salmon and steelhead.

The Butte Creek/Sanborn Slough Bifurcation Upgrade Project was partially completed in December 1999 at a cost of $1 million from the Sacramento National Wildlife Refuge Complex. Two improvements to reduce adult fish stranding in Lower Butte Creek, consisting of an adult fish barrier and a structure to redirect drainage water, were completed in 2000 with $180,000 from USFWS. Additional projects have been identified to improve fish passage in Lower Butte Creek at a total estimated cost of $29 million. Further evaluations are needed for some structures in Lower Butte Creek.

DWR was to conduct preliminary engineering investigations during 2002 for fish ladders at Willow Slough and Weir 2 in the east side of Sutter Bypass. In the west side of Sutter Bypass, Montgomery-Watson completed preliminary engineering for improving fish passage past Weir 3, Weir 5, and East-West Weir and each is under construction for new fish ladders to be completed by the end of 2002. The cost of rehabilitating Weir 3 and constructing new fish screens at the diversion is around $320,000. The cost of a new fish ladder and screen at Weir 5 is about $1.4 million. The estimated cost of rehabilitating East-West Weir and building a new fish ladder is $900,000. In addition, the company completed engineering investigations for Weir 1 and Guisti Weir during summer 2001. No further work is planned for these two structures. DFG is negotiating to purchase water rights at Guisti Weir and if successful will continue to use the existing fish bypass channel around the weir.

Sutter Bypass

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?	*Comment*
Wadsworth Canal Outfall	3.4		26	Outfall structure			Fish barrier recommended to exclude fish from canal
Willow Slough Weir	9.6	10	275	Earthen dam with two 5-ft. diameter cmp culverts	Denil fish ladder	Yes, at certain flows	
Weir #1	19.9	12	26	Concrete diversion weir (five 5-ft. bays)	Vertical slot fish ladder	Yes, at certain flows	Replacement needed
Guisti Weir	22.5	6	115	Earthen dam with two 4-ft. diameter cmp culverts	Bypass channel	Yes, at certain flows	
Weir #2	25	13	82.5	Concrete diversion weir (twelve 5.88-ft. bays)	Pool and weir fish ladder	Yes, at certain flows	Flashboards removed when flooding is imminent.
Weir #3	25	8	30.6	Concrete diversion weir with flashboards (six 4.4-ft. bays)	None	Yes, at certain flows	Flashboards installed April-Sept.
Weir #5	28.9	10.1	73	Concrete diversion weir with flashboards (eleven 6-ft. bays)	None	Yes, at certain flows	Flashboards installed April-Sept., removed in fall.
East-West Diversion Weir	29.8	7.5	19.6	Concrete sill with flashboard weir (four 4.4-ft. bays)	None	Yes, at certain flows	Flashboards are installed April-Sept., removed in fall

Butte Creek

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?	Comment
Tarke Weir	3.6			Concrete weir	None		
Drivers Cut Weir	5.5		24	Concrete weir	None		
Drumheller Slough Outfall	8.3	6	12	Flashboard weir with an 8-ft. riser and 84-inch culvert outlet structure	None	No, but if boards are improperly placed, fish could pass.	Structure to discourage fish from entering the system.
White Mallard Outfall	10.2	6-ft. drop at low flow	90	Flashboard weir with a riser and outlet structure	None	Operational agreement has been developed to improve fish passage.	Weir remains in place all year round.
White Mallard Dam	12.0			Flashboard weir with several bays	Pool and weir fish ladder	Yes, at certain flows.	Operated from Mar 1 to Jan 15.

Cherokee Canal

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?	*Comment*
Morton Weir	0.9		25	Concrete weir	None		
Mile Long Canal	1.0		12	Concrete weir	None		

Sanborn Slough

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?	*Comment*
End Weir	2.8			Earthen weir	None		
North Weir	1.7	2 to 4-ft. drop		Flashboard weir	None	Yes, minimal hindrance from fall through spring	Flashboards are removed on Aug 15–June 1

For more information, please contact:

- Paul Ward, Department of Fish and Game. (530) 895-5015. E-mail: ward@dfg2.ca.gov.
- Olin Zirkle, Ducks Unlimited, Inc. (916) 852-2000. ozirkle@ducks.org

Saeltzer Dam Berm, Clear Creek – Shasta County

Saeltzer Dam was removed from Clear Creek in November 2000. A berm of cleaned spawning gravel was constructed downstream from the dam site to retain additional sediment. Armored with large rocks, it did not wash out as predicted with winter storms. This created a new barrier to spring-run salmon expected to migrate upstream in late winter.

DWR

Clear Creek before removal of armored gravel berm

The Fish Passage Improvement Program provided construction resources under the direction of the U.S. Bureau of Reclamation to quickly remove the armoring and disburse the berm in March 2001. The project cost $28,000, and was completed before spring-run migration began. For more information contact:

- Ted Frink, DWR, (916) 651-9630. E-mail: tfrink@water.ca.gov.
- Tricia Bratcher, Department of Fish and Game, (530) 225-2345. E-mail: pbratcher@dfg.ca.gov.

Removing armored gravel berm.

DWR

Clear Creek after removal of armored gravel berm.

DWR

Mill Creek –Tehama County

In the early 20th century, three small diversion structures, Upper Dam, Clough Dam and Ward Dam, were built on lower Mill Creek to divert agricultural water. Fish screens and fish ladders have been in place for many years at each structure and are operated and maintained by the state Department of Fish and Game.

Ward Dam

Five-foot-high Upper Dam and 5-foot-high Ward Dam have sloping-downstream faces that fish can swim over when there are sufficient flows. In wet years, fish can navigate Mill Creek and reach spawning grounds. In dry years, however, so much water may be diverted from the creek that fish passage is impossible. Ward Dam was rebuilt in 1997 and DFG built a new modified pool and chute ladder. In 1997, winter floods significantly damaged Clough Dam. Today, it is only partially intact and scheduled for removal.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?
Clough Dam	4.2	N/A	N/A	Concrete diversion dam (partially washed out)	Pool and weir fish ladder	Dam Proposed for removal

The state Department of Water Resources, DFG, the U.S. Bureau of Reclamation, the owner of Clough Dam, the water rights holders, and the water users have come up with a plan to remove Clough Dam and provide water to users from an outlet structure to be built at the Los Molinos Mutual Water Company diversion ditch north of the creek. The diverted water would then be siphoned under Mill Creek and into the existing diversion ditch. USBR is managing the CALFED contract for this project. Construction was originally slated to begin in December of 2000 but, due to landowner concerns, has been pushed back two years.

Today, LMMWC and DFG lease 7 percent of the water right from a water rights holder to augment instream flow below Ward Dam. In addition, LMMWC and DWR have a water exchange agreement for enhancing instream flow in which DWR pumps water from two wells into LMMWC canals in exchange for water released by LMMWC. DFG can request pulse flows and LMMWC, on a voluntary basis, will try to accommodate.

The Mill Creek Adaptive Management Enhancement Plan will provide a more stable, secure source of water for migrating spring and fall-run Chinook salmon in lower Mill Creek. The plan will increase flow in the lower creek to 50 cfs below Ward Dam between April and June, and 25 cfs from 16 Oct to 15 Nov. These target flows are a starting point that will be used until the actual flows required for successful fish passage over the dams can be determined. The goal of the plan is to increase the number of naturally produced adult spring-run Chinook salmon in Mill Creek to 4,400 in order to meet the USFWS Anadromous Fish Restoration Program target.

Under the Plan, the Orange Cove Irrigation District will acquire 7.5 percent of the adjudicated Mill Creek flow that will be held in trust with LMMWC. The water will be dedicated to instream flow from 16 Oct through June under an adaptive management strategy. The water acquired during the rest of the year will be made available to LMMWC in exchange for pulse flows and reliable water in dry years. DFG will determine the most appropriate timing for pulse releases. OCID has also agreed to conduct studies to develop additional water supplies to enhance fish passage below Ward Dam. This additional water will likely come from conservation practices or a conjunctive use program. In addition to enhancing instream flow below Ward Dam, the plan provides for monitoring and research to analyze hydrologic and biological data to manage fish flows, improve fishery flow strategies, and identify biological triggers required for adaptive management on Mill Creek. The Plan will be implemented over three years and will cost $1.5 million. Funding has been obtained, however negotiations with landowners concerning the siphon have not yet been completed and the project has not yet been started.

For more information about the Mill Creek Adaptive Management Enhancement Plan, contact:

- Curtis Anderson, DWR. (530) 529-7348. E-mail: curtisa@water.ca.gov
- Trisha Bratcher, DFG. (530) 225-3845. E-mail: pbratcher@dfg.ca.gov.
- William Beren, LMMWC, P.O. Box 211, Los Molinos, CA 96055. (530) 384-2737. E-mail: lmmutual@shasta.com.
- James Chandler, OCID, P.O. Box 308, Orange Cove, CA 93646. (559) 626-4461. E-mail: ocid@psnw.com.

Daguerre Point Dam–Yuba River

Daguerre Point Dam

The 24-foot-high Daguerre Point Dam was built in 1906 by the federal California Debris Commission and the state to prevent hydraulic mining debris generated in the Sierra Nevada from washing into the Feather and Sacramento Rivers. The dam was equipped with two fish ladders in 1937 that Chinook salmon and steelhead have difficulty, under certain flow conditions, locating and navigating. The U.S. Army Corps of Engineers rebuilt the dam in 1964 following damage from the 1964 floods. The 60-acre-foot reservoir behind the dam is filled with coarse sediment to its crest and currently passes all sediment over the dam under high flows. The dam currently provides head for water diversion for three irrigation districts.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?
Daguerre Point Dam	11.5	24	575	Concrete diversion dam	Pool and weir fish ladder on each bank.	Passage problems at certain flows

At issue are the upstream and downstream fish passage impacts of Daguerre Point Dam. Salmon and steelhead swimming upstream can be delayed or blocked by the dam under certain conditions, including high-river flows and debris in the fish ladders. Juvenile fish migrating downstream can be entrained into irrigation diversions which do not have fish screens, can be preyed upon at the base of the dam, and can be injured or killed going over the dam. Some are concerned that if the dam is removed, predatory fish now blocked by it would be able to swim upstream to primary salmon and steelhead rearing grounds. There are also concerns about contaminated sediment behind the dam and the current function and value of Daguerre Point Dam in controlling sediment transport downstream as it was originally intended.

The Lower Yuba River Technical Working Group, including the U.S. Army Corps of Engineers, the Yuba County Water Agency, the state Department of Fish and Game, the state Department of Water Resources, the National Marine Fisheries Service, the U.S. Fish

and Wildlife Service, the South Yuba River Citizens League, Friends of the River, and other parties, was convened in 1998. The parties of the Technical Work Group agree that more information is needed to evaluate fish passage improvement options at Daguerre Point Dam. Stakeholders and partner agencies are developing, conducting, and coordinating additional studies to examine the dam's impacts on fish and to develop a restoration prioritization plan to understand and implement other opportunities to improve habitat conditions in the lower Yuba River. Beginning in 1996, USFWS had funded the USACE through the Anadromous Fish Restoration Program, to study fish passage improvement options at Daguerre Point Dam. This study was completed in August 2001 (USACE 2001) and reviewed the possible costs and impacts of preliminary alternatives. A total of eight alternatives were reviewed and five of those were eliminated from further evaluation. Those eliminated included 1) modifying existing ladders, 2) constructing a natural bypass channel around the dam, 3) installing an inflatable bladder dam, 4) modifying the spillway of the dam, and 5) constructing trap and truck fish facilities. The alternatives selected for further analysis were no action, constructing new fish ladders, and removing the dam.

DWR and USACE have agreed to be co-lead agencies and complete the necessary environmental studies through support of DWR's Fish Passage Improvement Program. Consultants have been hired by DWR to assist the agencies and stakeholders in developing some of the previously identified alternatives or new alternatives that were dropped in the preliminary studies by USACE in 2001. The contractors and DWR and USACE will prepare an EIR/EIS that will identify a preferred alternative to improve anadromous fish passage at the dam. The contractors under guidance from the Technical Working Group and the lead agencies will conduct additional studies to examine the dam's impacts on fish for analysis of alternatives to improve fish passage. The EIR/EIS is scheduled for completion in 2003. As part of the work, DFG and the U.S. Geological Survey will study the sediments behind the dam to resolve environmental concerns over mercury contamination. The schedule calls for studies to be conducted in 2002, with a decision in early spring 2003.

For more information, contact:

- Ted Frink, DWR, Fish Passage Program, 1416 Ninth Street. Sacramento, CA 95814. (916) 651-9630.
- Craig Fleming, USFWS Anadromous Fish Restoration Program. (209) 946-6400 ext. 315. E-mail: craig_fleming@fws.gov; or
- Curt Aikens, Yuba County Water Agency. (530) 741-6278. E-mail: caikens@ycwa.com.
- John Nelson, DFG Anadromous Fish Restoration Program Coordination. (916) 358-2944. E-mail: jnelson@dfg.ca.gov.

Harry L. Englebright Dam-Yuba River

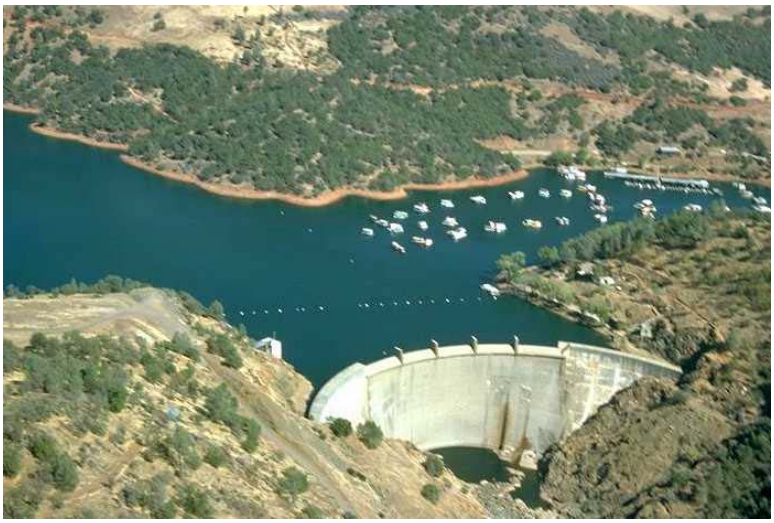
Harry L. Englebright Dam is in the Sierra foothills 21 miles east of Marysville on State Highway 20. Construction of the dam began in 1938 and was completed in 1941 at a cost of $4 million. Englebright Dam was built primarily to prevent upstream hydraulic mining debris from moving downstream into the Yuba River floodplain. The dam is a concrete constant angle arch dam, 260 feet tall and 1,142 feet in length. It impounds Englebright Lake, which is approximately 227 feet deep at the dam, covers 815 surface acres, is 9 miles long, and has 24 miles of shoreline.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish Passage Facility	Passage?
Harry L. Englebright Dam	24	260	1,142	Concrete dam	None	No

Englebright Dam blocks migration of Chinook salmon and steelhead. The Upper Yuba River may present an opportunity for the CALFED process to improve habitat for native species whose populations are in decline, while developing a comprehensive plan that will restore ecological health, improve water management and provide positive benefits to the public. If restoration and introduction is feasible, stretches of the Upper Yuba River could provide a significant amount of habitat to help salmon and steelhead populations flourish and avoid implications of the Endangered Species Act.

In 1998, the CALFED Ecosystem Restoration Program recommended a studies program to determine if returning steelhead trout and spring-run salmon to the Yuba River was feasible by changing Englebright Dam. In 1999, the Upper Yuba River Studies Program was started to determine if the introduction of wild Chinook salmon and steelhead trout to the Upper Yuba River watershed is biologically, environmentally, and socio-economically feasible over the long term. The primary study area for this program includes the South Yuba River and its tributaries below Lake Spaulding, the Middle Yuba River and its tributaries below Milton Reservoir, and the North Yuba River and its tributaries below New Bullards Bar Reservoir.

Those participating in the Program's Upper Yuba River Work Group include federal and state agencies, county supervisors, water and irrigation districts, commercial fishing organizations, sport fishing organizations, local and national environmental organizations,



CALFED

Englebright Dam

recreational and business organizations, flood control committees, county governments, and PG&E.

The Work Group has identified the following critical issue areas for study: 1) condition of upstream habitat for spring-run Chinook salmon and steelhead; 2) condition of downstream habitat for fall-run and spring-run Chinook salmon and steelhead; 3) public health and safety (flood control); 4) economics; 5) sediment control and water quality; and 6) water supply effects.

The program has three phases including Phase 1 in which stakeholder workgroups developed a list of study recommendations from which technical experts will develop feasibility study scopes of work; Phase 2 in which feasibility studies will be conducted for priority issues identified by the Work Group, and; Phase 3 in which the results of analyses will be evaluated and the combined stakeholder group make recommendations on future steps. Phase 1 is complete and Phase 2 feasibility studies have been contracted and are to begin in late 2002.

For more information, contact:

- Terry Mills, CALFED Bay-Delta Program. E-mail: tmills@water.ca.gov.
- John Nelson, DFG. (916) 358-2944. E-mail: jnelson@dfg.ca.gov.
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Lower Sacramento River and Delta Tributaries

Cosumnes River – Sacramento County

Four migration barriers – Hop Ranch Dam, Blodgett Dam, a low-flow road crossing, and Granlees Diversion Dam – impede migration to suitable spawning areas of the Cosumnes River. Hop Ranch Dam, damaged in 1997 floods, and the road crossing are barriers to upstream migration that delay migrating fish in normal to low-flow years. This has sometimes resulted in no fall-run salmon spawning in the river.

DFG

Granlees Diversion Dam

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Road Crossing	7	3	90	Seasonal dirt road	culvert	Yes
Hop Ranch Dam	16	4		Flashboard dam	none	Impedes passage at flows below 80-100 cfs
Blodgett Dam	23	6	72	Flashboard dam	Temporary fish passage channel	Passable at high flows
Granlees Diversion Dam	34	17	364	Dam	ladders and a screen	Passable at moderate flows

Blodgett Dam, owned by the Omochumne-Hartnell Water District, was damaged by 1997 floods and was inoperable. Approximately 200 fall-run salmon were stranded below Blodgett Dam in fall 1998. Flows at the time were 70 cfs. Flows above about 150 cfs are required for this structure to effectively pass fish. A fish bypass channel was excavated around the dam, resulting in stream channel erosion. The district rebuilt the dam, including channel improvements and fish passage in the new design, in fall 2002 with funds from the Federal Emergency Management Agency. The Fish Passage Improvement Program participated with the Department of Fish and Game and the district in planning fish passage improvement at the dam. DWR withdrew from participation when questions arose concerning the District's legal water rights in conjunction with their proposed uses of the water to be stored behind the dam.

DFG

Fish ladder at Granlees Dam

Rancho Murieta Community Service District operates 17-foot-high Granlees Diversion Dam. The dam has two fish ladders, which are functional between a narrow range of flows. However, the ladders are both more than 70 years old, in need of repair, and filled with coarse sediment. An informal inspection by DFG in 1998 suggests the following deficiencies:

- Excessive jump heights in all pools
- Inadequate dimensions in resting pools
- Substandard entrance pool for wide range of flows
- High risk of salmon spilling back into the basin after exiting the ladders due to poorly placed spillway
- Inadequate wall height increasing the risk of larger fish jumping out of resting pools
- Misleading attraction flows on opposite side of the basin.

DFG

Blodgett Dam after flood damage.

The minimum flow needed for effective passage at Granlees Dam fish ladders is about 150 cfs.

Solutions to these problems have been actively pursued since 1999. As a result, the Fishery Foundation obtained $376,510 in CALFED and AFRP funding for the Cosumnes River Salmonid Barrier Improvement Project. Modification of fish ladders at Granlees Diversion Dam will be completed in summer 2002. The project will bring the ladders up to current hydraulic criteria for fish passage and significantly increase their durability so they can withstand a wide range of hydrologic conditions. The ladders are designed to pass fish over a wide range of flows so that the occurrence of stranding will be reduced during low flow periods. Hopland Dam and the road crossing will be retrofitted with low-flow passage structures to allow for fish passage over a greater range of flows. Retrofitting of the road crossing was completed in summer 2000 and fall-run chinook salmon were observed successfully passing through the new crossing structure during the fall 2000 migration. These projects will essentially eliminate three barriers to fish passage on the Cosumnes River and mark the beginning of the recovery of sustained runs of fall-run chinook in the watershed. Post-project monitoring will be conducted for three years to compare run timing, migration delays, and spawner success to pre-project levels.

For more information, contact:

- Glenda Marsh, DWR, (916) 651-9632, E-mail: gmarsh@water.ca.gov.
- Ron Lowry, Omochumne-Hartnell Water District, 916-689-3900.
- Department of Fish and Game, Region II, (916) 358-2900.

Dry Creek – Sacramento and Placer Counties

DWR

Pipeline on Secret Ravine

Three dams and two pipeline crossings impede fall-run Chinook salmon and Central Valley steelhead migrating to upstream tributaries of Dry Creek that have excellent spawning habitat. The first downstream barrier is 9-foot-high Hayer Dam in Rio Linda. Built in the 1930s for irrigation, it is owned by Sacramento County, and provides water to a private water ski lake, Bell Aqua. In addition, there is a 4-foot-high concrete-block rubble dam, and the 20-foot-high Cottonwood Dam upstream. Cottonwood Dam, situated in the Hidden Valley residential subdivision on Miners Ravine, creates an impassable barrier. A city of Roseville abandoned water pipeline across the mouth of Secret Ravine and a sewer pipeline across Dry Creek also pose passage problems at low flows. Recently, the state Department of Fish and Game has stipulated the season of operation for the rubble dam to allow salmon and steelhead to pass during spawning season. DFG is also interested in evaluating and improving fish passage at Hayer Dam.

Dry Creek

Structure Name	RM	Height (ft.)	Width (ft.)	Description	Fish Passage Facility	Passage?
Hayer Dam	2.6	10	92	Flashboard diversion dam	None	Seasonal dam, passable when removed
Rubble Dam	4.6	6	51	Culvert	None	Yes, when opened
Sewer Pipeline	0.1	4	53	Pipeline	None	Potentially impassable at low flow

Miners Ravine

Structure Name	RM	Height (ft.)	Width (ft.)	Description	Fish Passage Facility	Passage?
Cottonwood Dam	7.4	20	100	Dam	None	No

Secret Ravine

Structure Name	RM	Height (ft.)	Width (ft.)	Description	Fish Passage Facility	Passage?
Water Pipeline	0.1	2	17	Pipeline	none	Potentially impassable at low flow

DWR

Hayer Dam, Dry Creek

Restoration and fish passage activities are coordinated by the Dry Creek Coordinated Resource Management Plan group. The state Department of Water Resources participates in the CRMP and coordinates fish passage improvements at Hayer Dam and other upstream structures. The CRMP is composed of city and county government, local flood control and park districts, local schools and colleges, fishing and conservation organizations, and state and federal resources agencies. Placer County and the Dry Creek Conservancy (DCC) have each received grants to restore various habitats along Dry Creek and a Central Valley Project Improvement Act Anadromous Fish Restoration Program grant to inventory conditions on Secret Ravine. A $605,000 grant was awarded Placer County to carry out CRMP objectives. The grant is intended to improve water quality and includes funding for a watershed management plan, water quality monitoring, and a demonstration restoration project on Miners Ravine. The plan also includes a strong public education component. In addition, both the city of Roseville and the Dry Creek Conservancy were successful in obtaining new CALFED grants in 2001 for development of a creek and riparian management and riparian restoration plan. In 2002, the city of Roseville also received a DWR Urban Stream Restoration grant to address erosion issues on Dry Creek in the vicinity of the city's sewer pipeline. The city has agreed to allocate some of the grant funds for fish passage improvement at the sewer pipeline along with the erosion control work scheduled in 2003. In addition, the city of Roseville has requested engineering and environmental permitting assistance from DWR for the removal of the abandoned water pipeline on Secret Ravine. Removal is planned for 2004. Sacramento County requested assistance from DWR to assess fish passage options at Hayer Dam; discussions with the county, community members and the water diverter using the dam continue. The Hidden Valley Homeowners Association requested assistance with fish passage at Cottonwood Dam. As a first step, DWR completed a barrier inventory and stream habitat quality survey above and below Cottonwood dam to help determine whether any benefits for salmonids could be gained by providing access to upstream reaches.

For more information, contact

- Glenda Marsh, DWR, (916) 651-9632. E-mail gmarsh@water.ca.gov
- Mark Morse, City of Roseville, (916) 774-5499. E-mail MMorse@roseville.ca.us
- Gary Hobgood, DFG, (916) 983-6920. E-mail: ghobgood@dfg.ca.gov

Murphy Creek – Amador and San Joaquin Counties

Murphy Creek is a tributary of the Mokelumne River that traverses Amador and San Joaquin Counties, entering the Mokelumne River immediately below Camanche Reservoir. Adult salmon and steelhead historically used the creek and are now only rarely seen in the lower portions. Two structures impede fish migration, Sparrowk Dam and Buena Vista Road bridge double box culverts. Sparrowk Dam historically provided water for livestock grazing.

DWR

Sparrowk Dam with concrete spillway in foreground, dam in background

The landowners adjoining Murphy Creek in San Joaquin County initiated a project to improve fish passage; restore rearing and spawning habitat for Chinook salmon and steelhead; restore native riparian vegetation to encourage the re-establishment of neotropical migratory birds and other special status wildlife species; improve water quality and improve water flows within the creek; and promote sustainable agricultural practices that continue to support livestock and vineyard production within the watershed.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Sparrowk Dam		8	60	Earthen Dam	None	No
road crossing			20 each	2 concrete double box culverts	None	No

EBMUD is the lead agency on this project and has prepared a Mitigated Negative Declaration pursuant to CEQA for the project. EBMUD has been working closely with the participating landowners to ensure that they will retain their water rights and at the same time be able to enhance the riparian and aquatic habitat within the watershed. DWR's Fish Passage Improvement Program has provided topographical surveys, archaeological surveys, and preliminary engineering design work. EBMUD planned to implement the project by late summer 2002.

The project is funded by grants from the CALFED Bay-Delta Program, $282,500; the National Fish and Wildlife Foundation, $95,000; the U.S. Fish and Wildlife Service's Anadromous Fish Restoration Program $10,000, and in-kind services from East Bay Municipal Utility District $115,000; and the California Department of Water Resources Fish Passage Improvement Program, $100,000.

To improve fish passage, the project will remove Sparrowk Dam, its spillway, and accumulated sediment from the reservoir. A well will be dug near the existing impoundment to provide water to a new stock-watering tank. In addition, the Buena Vista Road bridge

double box culverts will be modified or removed to improve fish passage during low-flow periods.

Cooperating agencies, organizations, and others include: Murphy Creek Landowners, Bev and Jack Sparrowk, East Bay Municipal Utility District, San Joaquin County Resource Conservation District, University of California, Davis, USDA Natural Resource Conservation Service, DFG, DWR, NMFS, and USFWS.

For more information, contact:

- Chris Lee, DWR, (916) 651-9623. E-mail: chrislee@water.ca.gov.
- Joe Merz, East Bay Municipal Utility District, (209) 365-1093. E-mail: jmerz@ebmud.com.
- Joan Florsheim, University of California, Davis, E-mail: florsheim@geology.ucdavis.edu.
- Department of Fish and Game, Region II, (916) 358-2900.

Lower Putah Creek – Yolo County

The Lower Putah Creek Anadromous Fish Passage Improvement Program will assess the degree to which four structures on the lower 30 miles of Putah Creek impede anadromous fish passage. The structures are:

Joe Krovoza

Check Dam

- The 12-foot-high seasonal checkdam in the Yolo Bypass used to create a head of water for irrigation pumping and to flood the Vic Fazio Yolo Wildlife Area
- Culverts under a seasonal road about River Mile 1.5
- The concrete remnants of the base of a dam a quarter mile below a former railroad crossing at the city of Winters
- The Putah Diversion Dam about River Mile 23.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Bypass Check Dam	1.5	12		Seasonal check dam	None	Under evaluation
Road crossing	1.5			Seasonal dirt road	Culvert	Culvert is may not be adequate for fish passage
Winters Percolation Dam	20	5		Remains of a concrete dam base that has been destroyed by a flood	None	Abandoned in 1952 after destruction by a 1951 flood. Passable at unknown flows
Putah Diversion Dam	24	16	910		None	Impassable except at flood flows

The fledgling program under the auspices of the Lower Putah Creek Coordinating Committee will oversee solutions to eliminate the barriers by modifying structures or managing them differently. There are already informal protocols for the operation of the seasonal check dam in the Yolo Bypass, requiring removal in the fall to allow salmon and steelhead passage. Addressing the Yolo Bypass checkdam is a high-priority of the program. How this structure should be managed or modified is being considered.

Those working on the Yolo Bypass checkdam include Solano County Water Agency, Putah Creek Council, Los Rios Farms, University of California, Davis, fisheries researchers, the state Department of Water Resources, the state Department of Fish and Game (DFG), and the Yolo Basin Foundation. Ten representatives from Yolo and Solano Counties comprise the LPCCC. The group will manage instream and riparian habitat restoration projects on

more than 30 miles of Lower Putah Creek from Monticello Dam to the Yolo Bypass. The cost of the project will depend on an initial assessment of passage barriers and the approved plans for modification or management of each barrier. Preliminary evaluations of the checkdam and road crossing were done in 2001 under a CALFED ecosystem restoration grant and DWR funds totaling $820,679. No specific projects have yet been proposed, nor is there a timeline or budget for fish passage improvements at the checkdam, road culvert, Putah Diversion Dam, or percolation dam remnants.

Those interested in Putah Creek are in a position to begin addressing barriers to anadromous fish passage. In May 2000, a Putah Creek accord was signed that ended a 10-year water rights dispute. Now there are permanent flows in Lower Putah Creek specifically designed to benefit the creek's assemblage of native fish. Importantly, the creek now has a set of supplemental flows designed to attract the native anadromous fish of Putah Creek (namely fall-run chinook salmon, steelhead trout and Pacific lamprey). The water rights accord set the stage for everyone to address the anadromous fish barrier issues. For more information, contact:

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- David Okita, General Manager, Solano County Water Agency, (707) 451-2904. E-mail: dokita@scwa2.com.
- Joe Krovoza, Chair, Putah Creek Council, (530) 758-6983. E-mail: jfkrovoza@ucdavis.edu
- Department of Fish and Game, Region II, (916) 358-2900.

Fremont Weir, Sacramento River – Yolo County

Fremont Weir is at the northern end of 40-mile-long Yolo Bypass, a 59,000-acre leveed basin, which functions as floodplain and conveys excess flows from the Sacramento River, Feather River, American River, Sutter Bypass and westside streams into the Sacramento-San Joaquin Delta. Under typical flood events, water spills into Yolo Bypass via the 1.5-mile long Fremont Weir when Sacramento basin flows surpass approximately 75,000 cfs. Field and anecdotal evidence shows that adult salmon migrate up the Yolo Bypass through the Toe Drain, the eastern edge channel and riparian corridor, in autumn and winter regardless of whether Fremont Weir spills.

Structure Name	RM	Height (ft.)	Width (ft.)	Description	Fish Passage Facility	Passage?
Fremont Weir	76.3	5	9000	Concrete	Ladder	No

Although there is a fish ladder, maintained by the state Department of Fish and Game, at the center of the weir, the ladder is small, outdated, and inefficient. Fish cannot pass at low flows. Therefore, unless there is overflow into the Yolo Bypass, fish cannot pass Fremont Weir and migrate further upstream to reach the Sacramento River. Sturgeon and sometimes salmon are attracted by high flows into the Yolo Bypass basin and then become concentrated behind Fremont Weir. There they are subject to heavy legal and illegal fishing pressure, a problem that is well known to DFG wardens.

In 2000, DWR's Fish Passage Improvement Program conducted elevation surveys of the area downstream of the weir as a preliminary step for a pilot fish passage facility and evaluation study for CALFED. Further work on the project has been suspended due to stakeholder concerns that have not yet been resolved.

DWR staff has been studying fish in the Yolo Bypass for the past several years. Since early 2000, DWR's Division of Environmental Services has participated in The Yolo Watershed Group, a forum for discussing issues and concerns in the Yolo Bypass. The group includes Yolo Bypass farmers, landowners, duck clubs, environmental groups and several regulatory agencies. For more information, contact:

- Ted Sommer, DWR, (916) 227-7537. E-mail: tsommer@water.ca.gov.
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Through-Delta Facility, Yolo Bypass - Yolo County

CALFED has determined that a Through-Delta Facility

, a 4,000 cfs diversion, could be an integral part to meeting two of its mandates: improving water supply and quality and protecting the Delta ecosystem. According to the Record of Decision, water quality, fish effects studies, and the development of project recommendations must be completed by the end of 2003. If a TDF is built, upstream fish passage around a fish screen, radial gate, or pumping plant structure will be a major design consideration.

DWR

Lisbon Weir; Yolo Bypass Toe Drain.

In coordination with the interagency North Delta Fish Facilities Technical Team, DWR Division of Environmental Services is developing a fish passage study at Lisbon Weir in the Yolo Bypass Toe Drain that will collect data for the development of the proposed TDF fish passage facilities. This study will provide information to help evaluate the feasibility of constructing a TDF fish facility for upstream passage of salmon, sturgeon, splittail and striped bass. The Yolo Bypass Toe Drain has many of the fish species that will be of concern at a TDF. DWR and DFG staffs have been conducting fish studies in the Yolo Bypass for several years. Field and anecdotal evidence show that adult salmon migrate up through the Toe Drain/Tule Canal in autumn and winter. High flow events in particular attract numerous upstream migrants through the Yolo Bypass corridor.

The Yolo Bypass, as the primary floodplain of the Delta, is a 59,000-acre leveed basin that conveys up to 500,000 cfs excess flows from the Sacramento Valley including the Sacramento River, Feather River, American River, Sutter Bypass, and four westside streams. Water initially flows in a channel along the eastern edge of the Bypass before spreading throughout the floodplain. This channel is called the Toe Drain south of Interstate 80. During the dry season, the Toe Drain channel remains inundated as a result of tidal action.

Lisbon Weir is a manmade structure that raises the water surface elevation upstream of it. The weir, in disrepair, partially consists of a sheetpile wall driven into the bottom of the Toe Drain channel and concrete riprap on the upstream side of the wall. Other portions of the weir are constructed of large concrete blocks. In an open side channel that flows around the weir on its west side, three flap gates allow tidal water to flow in the upstream direction but do not allow the water to flow back downstream.

Planned study activities include 1) constructing a fish passage monitoring station at Lisbon Weir in the Yolo Bypass Toe Drain, 2) capturing, telemetry tagging, and releasing fish one mile downstream, 3) examining the behavior of the tagged fish, primarily non-salmonid species, near Lisbon Weir as they migrate upstream, and 4) determining the conditions under which these fish move past the weir with minimal delay.

A rudimentary survey of Lisbon Weir, the gate structure, and a cross-section of the Toe Drain have been completed. A more detailed survey will be conducted of the area around the weir and the side channel. The side channel gates could be modified in future years to aid fish passage evaluations.

Due to the passive nature of this study at an existing barrier, no construction or modifications to the weir are planned and no permitting will be required. All planning activities for this program are being coordinated with regional restoration activities through the Yolo Bypass Working Group, an association of stakeholders, the Interagency Environmental Program's Yolo Bypass Project Work Team, the CALFED Ecosystem Restoration Program, and the NDFFTT.

For more information, contact:

- Zoltan Matica, DWR, (916) 227-2904. E-mail: zoltan@water.ca.gov.
- Ted Sommer, DWR, (916) 227-7537. E-mail: tsommer@water.ca.gov

San Joaquin River and Tributaries

Calaveras River – Calaveras County

There is spawning and rearing habitat for salmonids between Bellota Weir and New Hogan Dam (E. Van Nieuwenhuyse, USFWS). Twenty-eight unscreened diversions exist between Bellota and New Hogan Dam, within the service areas of the Stockton East Water District and Calaveras County Water District. Some diversions are in spawning and rearing habitat for fall-run Chinook salmon. The largest diversion is Bellota Weir, which regulates water between the historical Calaveras River channel, Mormon Slough, the main flood control channel, and the intake for SEWD's water treatment plant.

DWR

Flashboard dam on Mormon Slough

Water is diverted at Bellota for the 45million-gallon-per-day SEWD water treatment plant that supplies treated water to the Stockton urban area. The water treatment plant had a DFG fish screen that was inoperable at flows higher than 25 MGD and it was subsequently removed. Design, approval and funding of the replacement screen have not yet occurred. A CALFED funded evaluation is expected to recommend an appropriate design. In 1990, CCWD provided fish protection at its water treatment plant diversion facility below New Hogan Dam. In addition, numerous unscreened agricultural diversions associated with installation of seasonal flashboard dams exist in Mormon Slough, Potter Creek, and Mosher Creek. In dry or drought years, some of these waterways can dry up by the end of June. During the irrigation season, most water is diverted at Bellota Weir into Mormon Slough leaving the historical Calaveras River Channel dry.

In 1998, the Central Valley Steelhead ESU was listed as threatened by NMFS, and in February 2000, NMFS designated the Calaveras River and Mormon Slough as critical habitat for the Central Valley steelhead ESU.

In 1999, SEWD and CCWD received a grant from the SWRCB to implement the Calaveras River Watershed Study and have retained a consultant to conduct fish surveys and collect habitat and temperature data for the Calaveras River. The water districts are also involved in consultation with state and federal regulatory agencies to discuss operational changes at New Hogan Dam.

DWR

Bellota Weir with temporary fish ladder on Mormon Slough

Three studies are being conducted in the Calaveras River to improve fish passage and determine Chinook salmon and steelhead distribution and life history in the river. All three are benefiting from cooperative coordination. SEWD and CCWD have received preliminary

approval for a $670,000 CALFED Ecosystem Restoration Grant for Phases I and II of a fish screening project for diversions between Bellota and New Hogan Dam. Phase I is a feasibility study, including a reconnaissance-level study of the Calaveras River, preliminary designs for fish screens, fisheries monitoring, and a draft data collection and monitoring program. Phase II includes preliminary engineering designs for screening alternatives at the SEWD Bellota diversion, stakeholder meetings, prioritization of diversions for screening, and possible plans to consolidate diversions. CEQA and NEPA processes will be initiated during this phase. In Phase III a final design will be approved and permitting and environmental documentation processes will be completed. Construction and monitoring will be implemented as part of Phase IV. Additional funding will be required to complete Phases III and IV.

The Fisheries Foundation of California received $314,704 CALFED Ecosystem Restoration Grant to conduct the Calaveras River Chinook Salmon and Steelhead Population Abundance and Limiting Factors Analysis. The two-year study will be coordinated with a stakeholders group, and it will provide quantitative information upon which future restoration actions can be developed. The first year of field data collection was completed in 2002.

In addition, the DWR Fish Passage Improvement Program will conduct a barrier inventory and evaluation on the Calaveras River from its confluence with the San Joaquin River to New Hogan Dam, including Mormon Slough and other primary channels. The inventory was completed in 2001 and a preliminary report evaluating fish passage along the current migratory pathway is expected in 2003. The results of the study will be used in conjunction with salmon and steelhead life history data to identify and prioritize potential fish passage improvement projects.

For more information, contact:

- Glenda Marsh, DWR, (916) 651-9632. E-mail: gmarsh@water.ca.gov
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- John Nelson, DFG, (916)-358-2944. E-mail: jnelson@dfg.ca.gov
- Jim Cornelius, Director of Regulatory Affairs, Calaveras County Water District. P.O. Box 846, San Andreas, CA 95249. (209) 754-3543
- Kevin Kauffman, General Manager, Stockton East Water District, 6767 E. Main Street, Stockton, CA 95215. (209) 948-0333. E-mail: kkauffman@sewd.net

Calaveras River						
Structure Name	**RM**	**Height (ft.)**	**Width (ft.)**	**Description**	**Fish Passage Facility**	**Passage?**
Asphalt apron	6.12			Bridge apron	none	
Gotelli road crossing	6.2	4	20	Road	none	
McAllen dam	6.9	5.3	36	Dam	none	
Cherryland dam	7.9	8.1	46.2	Dam	none	
DWR stream gage weir	9.45	1.4	15.5	Weir	none	
Solari dam	10.1		48.3	Dam		
Pezzi dam	12	12.5	6.9	Dam	none	
Murphy dam	12.4	10.5	68.7	Dam	none	

Calaveras River						
Structure Name	**RM**	**Height (ft.)**	**Width (ft.)**	**Description**	**Fish Passage Facility**	**Passage?**
Eight Mile dam	14.7	8.82	70.15	Dam	none	
Tully dam	17.3	10	67.4	Dam	none	
Clements dam	20.7	9.6	58	Dam	none	
Gotelli dam	25.35	9.6	58	Dam	none	
Calaveras head works	25.87			Weir	none	
McGurk crossing	26.6		11.9	Road	none	
Gravel pit pond	27			In-stream pond		
Wilsons crossing	27.1	12	200	Road	none	
Dog Ranch Road	27.8	4	21.5	Road	none	
Williams crossing	30.4	2.8	134	Road	none	
Road	32.4	1.2	83	Road	none	
Gotelli crossing	32.8	1.2	100	Road	none	
Rubble dam	33	2	93.5	Dam	none	
New Hogan Dam Road	41.9			Bridge apron	none	
New Hogan dam	42.9	210	1960	Earth fill dam	none	Impassable at all flows

Mormon Slough-Stockton Diverting Canal						
Structure Name	**RM**	**Height (ft.)**	**Width (ft.)**	**Description**	**Fish Passage Facility**	**Passage?**
Central CA Traction RR	.95	17	200	RR trestle	none	
Budiselich dam	2			Dam	none	
Main Street dam	4.9			Dam	none	
Panella dam	6.6	4.85	40.3	Dam	none	
Caprini crossing	7.25	4.5	45	Road	none	
Lavaggi dam	7.5	7.2	45.4	Dam	none	
Hogan crossing	8.43	5	50	Road	none	
McClean dam	8.5	6.76	45.5	Dam	none	
Fujinaka crossing	9.48	5	110	Road	none	
Pratto dam	10.4	6.8	45.6	Dam	none	
Mormon Slough trestle	11.1	23.5	249.5	RR trestle	none	
Piazza dam	12	6.8	50.4	Dam	none	

Mormon Slough-Stockton Diverting Canal						
Structure Name	**RM**	**Height (ft.)**	**Width (ft.)**	**Description**	**Fish Passage Facility**	**Passage?**
Bonomo dam	12.2	7.1	38.4	Dam	none	
Hosie low water crossing	13	1.2	152	Road	none	
Hosie dam	13.4	1.2	152	Dam	none	
Avansino dam	14.4	7.5	60.9	Dam	none	
Fine dam	15.4	8	80.8	Dam	none	
Flashboard dam	16.55	6.2	65.5	Dam	none	
Watkins crossing	16.86	0.2	196	Road	none	
Bellota weir	18		170	Dam	Denille ladder-temporary in fall.	Impassable at lower flows

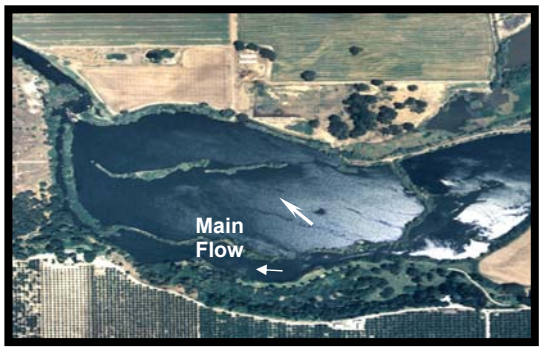
Note: Complete data for some structures not available at this time.

Merced River – Merced County

The Merced River abandoned its river channel and captured gravel pits in several reaches in the early 1980s and after a January 1997 flood. In these reaches the river travels through wide areas, where characteristics varied from flat areas with an undefined channel and shallow flow to deep, slow-moving ponds. This creates barriers to both juvenile and adult salmon. The shallow areas present stranding issues during flow fluctuations on this dam-controlled river, as well as avian predation of smolts. During summer and fall flows, the shallow areas create a passage problem for spawning adults migrating upstream. The instream ponds provide habitat for predatory fish such as largemouth and smallmouth bass that prey on juvenile salmon. Juvenile salmon migrating downstream may become disoriented in the slow moving waters of the pond and become vulnerable to predation.

Structure Name	RM	Description
Magneson Pond	32	Pit
Ratzlaff Pond	40	Pit
Western Stone	41	Pit
Lower Robinson Reach	42	Pit
Upper Robinson Reach	44	Pit

Since the mid-1990s, the state Department of Fish and Game and the state Department of Water Resources have initiated several projects to remediate these shallow reaches and instream ponds. The Magneson Pond Isolation Project, completed in 1996 at a cost of $450,000, isolated predator habitat, improved the adult and juvenile migratory pathway, and increased and enhanced riparian cover and spawning habitat for salmon.



DWR

Ratzlaff gravel pit before restoration.

A $20 million Merced River Salmon Habitat Enhancement Project will remediate 4.5 miles of abandoned mining pits and breached levees. In addition to achieving the results listed above, this project will also increase salmon rearing habitat, improve flood plain dynamics by reconfiguring the channel to better conform to the dam-regulated flow and increasing the floodplain width from 400 to 1,400 feet. The project is protected into perpetuity with a conservation easement. This project has the support of the CALFED Bay-Delta Program, the U.S. Bureau of Reclamation and the U.S. Fish and Wildlife Service, the Central Valley Project Improvement Act Anadromous Fish Restoration Program, Wildlife Conservation Board and local agencies and landowners. Additional funding has come from DFG Proposition 70 funds and the Tracy Fish Mitigation Agreement. Component river reaches include the $4.86 million Ratzlaff reach completed in

DWR

Ratzlaff gravel pit after restoration

1999, the $8.02 million Robinson Reach constructed in 2001, and Lower Western Stone and Western Stone Reaches are planned for 2003-2004. For more information, contact

- Kevin Faulkenberry, Department of Water Resources. 3374 E. Shields, Fresno, CA, 93726. (559) 230-3320. E-mail: faulkenb@water.California.gov, or
- Tim Heyne, Department of Fish and Game. (209) 853-2533. E-mail: theyne@dfg.ca.gov.

Stanislaus River – Stanislaus County

There are about 16 gravel pits on the Stanislaus River that create instream ponds. The ponds provide habitat for predatory fish such as largemouth and smallmouth bass, which prey on juvenile salmon. The juvenile salmon migrating downstream become disoriented in the slow waters of the ponds and become extremely vulnerable to predation.

Structure Name	RM	Description
Oakdale Recreation Area 1	33.9	Pit
Oakdale Recreation Area 2	34.2	Pit
Oakdale Recreation Area 3	34.4	Pit
Oakdale Recreation Area 4	34.7	Pit
Oakdale Recreation Area 5	34.9	Pit

In September 1996, the Willms Project was approved and was expected to cost $2.7 million. It was to eliminate a 10.6-acre pond through which the Stanislaus River runs. The project included eliminating salmon-predator habitat, increasing salmon spawning and rearing habitat, improving the adult and juvenile salmon migratory pathway, improving flood plain dynamics by reconfiguring the channel to better conform to the present flow regime, and enhancing the riparian corridor. In March 1998, the project was stopped due to landowner concerns.

The Fish Passage Improvement Program is taking the lead to develop an Oakdale Recreation Pond gravel pit isolation/restoration project with the Anadromous Fish Restoration Program Fisheries Technical Working Group to address losses of juvenile fish migrating downstream. Site visits and coordination meetings to initiate project development have taken place since February 2001. Coordination and planning will include local area government staff, landowners, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, National Marine Fisheries Service, state Department of Fish and Game, San Joaquin District of the state Department of Water Resources, and the State Water Resources Control Board. Preliminary restoration design began in 2002 and an initial public workshop about the potential project was also held. Environmental documentation and permits will be obtained in 2003, and construction is planned for 2004. Cost estimates are not yet available.

USACE

For more information, contact:

- Glenda Marsh, Department of Water Resources. 1020 9th Street, Sacramento, CA, 95814. (916) 651-9632. E-mail: gmarsh@water.ca.gov.
- Kevin Faulkenberry, DWR. 3374 E. Shields, Fresno, CA, 93726. (559) 230-3320. E-mail: faulkenb@water.ca.gov.
- Tim Heyne, Department of Fish and Game. (209) 853-2533. E-mail: theyne@dfg.ca.gov.
- Angie Wulfow, U.S. Army Corps of Engineers, (209) 881-3517. E-mail: angie.c.wulfow@usace.army.mil.

Dennett Dam, Tuolumne River – Stanislaus County

The city of Modesto built Dennett Dam, a low, concrete structure, in 1933 for recreation. It created a swimming and fishing lake on the Tuolumne River near Modesto. At one time there were fish ladders at each end of the dam and during the 1940s there was a counting station for salmon. The dam fell into disuse and the concrete has been eroding. Later, the top portion of the dam was removed, but the footing remains, potentially creating a passage barrier to juvenile fish and to migrating sturgeon and American shad. It is also a hazard to recreational boaters.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Dennett Dam	16.7			Dam footing	notch	partial

In the 1970s, DFG made a mid-channel breach to allow fish passage at low flows and it installed a fish ladder, but it washed away. DFG has investigated removing the structure. In addition, the San Joaquin River Management Program in its 1995 report identified the remnants of Dennett Dam as a potential fish passage barrier and recommended its removal. DFG biologists do not consider the dam problematic to adult migrating salmon or steelhead.

DWR

Dennett Dam, Tuolumne River

The city of Modesto has targeted the dam for removal as part of a master plan for development of the Gateway portion of the Tuolumne River Regional Park system. Gateway Park would be the centerpiece of the regional parkway in the city of Modesto along the Tuolumne River where Dennett Dam is located. DWR saw an opportunity to remove the dam sooner in conjunction with the 2002 replacement of the 9th Street bridge, which sits directly over the dam. DWR approached the city with this proposal, however, the bridge project was 95 percent planned with final CEQA and NEPA documents completed. There was not enough time in the planning schedule to alter the documents to include the dam removal and stay on schedule for the spring 2002 construction start. For more information, contact:

- Glenda Marsh, DWR, (916) 651-9632. E-mail: gmarsh@water.ca.gov.
- Fred Allen, City of Modesto, (209) 577-5353. E-mail: fallen@ci.modesto.ca.us.
- Tim Heyne, Department of Fish and Game. (209) 853-2533. E-mail: theyne@dfg.ca.gov.

Bay Area and Delta

Alameda Creek – Alameda County

Jeff Miller

East Bay Regional Park District Swim Dam prior to removal in 2001

A flood control drop structure owned by the Alameda County Flood Control and Water Conservation District in lower Alameda Creek has blocked steelhead trout from spawning and rearing habitat in Sunol Regional Wilderness and other areas of the Upper Alameda Creek watershed since the 1960s. There are numerous other structures in the creek that act as barriers or partial barriers to fish passage including: three inflatable dams and water diversion structures in the lower creek's flood control channel, owned by the Alameda County Water District; 6-foot-high Niles Dam and 12-foot-high Sunol Dam in Niles Canyon owned by the San Francisco Public Utilities Commission; a PG&E gas-pipeline crossing; and two small, concrete swim dams in the Sunol Wilderness owned by the East Bay Regional Park District. In order to restore a steelhead fishery to Alameda Creek, modification for fish passage and protection at these facilities is being explored, as well as modification of county-owned culverts and a drop structure in Stonybrook Creek and Arroyo Mocho, both tributaries to Alameda Creek.

Alameda Creek

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
BART weir	9.5	12		Concrete sloping drop structure	None	No
Middle Inflatable Dam	9.6	13	276	Seasonal, inflatable rubber dam	None	Passable when deflated
Upper Inflatable Dam	10.5	13	375	Seasonal, inflatable rubber dam	None	Passable when deflated
Niles Dam	11.9	6		Dam	Nonfunctional ladder	Observed passable at 233-397 cfs
Sunol Dam	16.3	22		Dam	Nonfunctional ladder	No
Natural Gas Pipeline	18.6	10		Sloping articulated concrete mat protecting 36 ft.	None	Barrier at all but the highest flows
Weir	19.7	6		Rock gabions 6 ft. high and 10 ft. deep	None	Passable at modest flows
Concrete swim dam # 1	23.8	7	88	Dam	None	No
Concrete swim dam # 2	24.0	7	63	Dam	None	No
Alameda Creek Diversion Dam	27.6			Dam diverts water to Calaveras Reservoir	None	No

Alameda Creek

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?

Arroyo Mocho

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Drop Structure	0	2-3		Sloping structure and concrete apron	None	Probably passable at 10-12 cfs
Drop Structure	7.5	3-4		Vertical structure stabilizing a railroad bridge	Potential passage in a side channel.	No passage at 10-12 cfs. May be passable at higher flows.
Road Crossing	12	Slopin g 20 ft. section		Concrete apron, 20-ft. steeply sloping section plus 20-ft. low gradient section	None	May be passable at 100-150 cfs

SFPUC

Sunol Dam

Community and agency support for restoring migratory fish runs has been building. In February 2000, the Alameda Creek Fisheries Restoration Workgroup released a report that concluded it would be feasible to restore a viable steelhead fishery to Alameda Creek. The study outlined the changes necessary to begin restoration and showed there is suitable habitat to support a self-sustaining population of steelhead trout. The report also identified items that required additional study, including the determination of instream flow requirements to support a steelhead fishery, and the source of water for these flow requirements.

SFPUC

Niles Dam

In addition, considerable media attention and new environmental regulations concerning anadromous fish motivated management agencies to participate in the restoration. Participants include Alameda Creek Alliance, Alameda County Flood Control and Water Conservation District, Alameda County Water District , San Francisco Public Utilities Commission, PG&E, DFG, state Department of Water Resources, National Marine

Fisheries Service, East Bay Regional Park District, California State Coastal Conservancy, U.S. Army Corps of Engineers , city of Fremont, Zone 7 Water Agency, Bay Area Rapid Transit, Math/Science Nucleus, and Alameda County Supervisor Scott Haggerty.

Among the projects being developed, ACFC&WCD and ACWD are working closely with USACE to pursue 1135 Program funds for construction of fish passage improvements in the lower, channelized portion of the creek. A conceptual plan prepared by CH2MHill proposes three fish ladders and seven fish screens in the lower flood control channel. The estimated costs of the proposed fish facilities at the lower barriers, including engineering, mitigation for environmental impacts, construction inspection, and contract administration are $1.5 million at the lower inflatable dam, $2.9 million at the BART weir and middle inflatable dam, and $1.4 million at the upper inflatable dam. The estimated cost of the seven fish screens is $4.1 million. The total estimated cost of the proposed projects is $9.9 million. If funds are procured construction is expected in 2005.

In addition, SFPUC announced in March 2000 that it would remove or modify Niles Dam, a partial barrier, and Sunol Dam, a significant barrier, in Niles Canyon. Due to sediment behind Sunol Dam an environmental assessment is needed. PG&E is also investigating alternatives to improve fish passage at its gas-pipeline crossing. PG&E would place a series of additional articulated concrete mats with backfill to regrade the site, construct a series of step pools in the middle of the existing structure, and build a traditional fish ladder.

Paul Salop

Bart Weir, Lower Alameda Creek

In August 2001, EBRPD removed two small swim dams in Sunol Wilderness at a cost of $100,000. DWR shared the cost of removing the swim dams.

Paul Salop

Inflatable Dam, Lower Alameda Creek

For more information, contact:

- Ted Frink, DWR, (916) 651-9630. E-mail: tfrink@water.ca.gov.
- Eric Cartwright, ACWD. (510) 659-1970. E-mail: eric,cartwright@awcd.com;
- Laura Kilgour, ACFC&WCD. (510) 670-6478. E-mail: laura@acpwa.mail.co.alameda.ca.us
- Pete Alexander, EPRPD, (510) 482-6030. E-mail: palexand@ebparks.org;
- Jeff Miller, Alameda Creek Alliance. (510) 845-4675. E-mail: alamedacreek@hotmail.com.
- Joshua Milstein, City of San Francisco. (415) 554-4649. E-mail: Jmilstei@puc.sf.ca.us.

Los Trancos Creek – Santa Clara County

Kevin Murray, S.F. Creek JPA

Los Trancos/Agosti Dam on Los Trancos Creek

Los Trancos Creek, a tributary to San Francisquito Creek, sustains a steelhead trout population that has historically been naturally reproducing, primarily in the 2½ miles of the creek below Stanford University's Felt Lake Diversion Dam. A fishway built at the Felt Lake Diversion Dam in 1995 provided access to an additional 3.5 miles of the creek and the Department of Fish and Game has been working with Stanford University to implement improvements to the fishway. However, three structures upstream of the fishway significantly impede upstream steelhead migration to the headwaters of Los Trancos Creek. The first structure upstream of the fishway is an obsolete flashboard swim dam, Los Trancos/Agosti Dam, which presents the most severe steelhead migration barrier in upper Los Trancos Creek. Two box culverts also restrict adult steelhead migration under certain flow conditions.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Los Trancos/Agosti Dam	3	6		Flashboard dam with concrete-lined basin	Dam is notched	Passable at intermediate and high flows
Felt Lake Diversion Dam	2.5			Dam	Ladder	Operating
Culvert				Culvert		Low flow barrier
Culvert				Culvert		Low flow barrier

In March 2002, the San Francisquito Creek Joint Powers Authority and San Francisquito Watershed Council submitted a grant proposal to the American Rivers – NOAA Community-Based Restoration Program Partnership to fund a project to remove the Los Trancos/Agosti Dam. American Rivers and NOAA approved the request of $49,000 for the removal of the structure and DWR is assisting the San Francisquito Watershed Council in planning the project. The removal of the Los Trancos/Agosti Dam could occur as early as summer 2003.

For more information, contact:

- Chris Wilkinson, DWR, (916) 651-9629. E-mail: cdw@water.ca.gov.
- Kevin Murray, San Francisquito Creek Joint Powers Authority, (650) 251-8831. E-mail: kmurray@menlopark.org.
- Phil Chang, San Francisquito Creek Steelhead Technical Task Force. (650) 962-9867 ext. 304. E-mail: philc@acterra.org.
- Erika Cleugh, DFG, (831) 649-7153. E-mail: ecleugh@dfg.ca.gov.

Drop Structure, Marsh Creek – Contra Costa County

NHI

Drop structure: Marsh Creek

Marsh Creek is a tributary of the San Joaquin River in Contra Costa County. The lower Marsh Creek drop-structure, in the city of Brentwood, is a grade-control structure about 4 miles upstream from the mouth of Marsh Creek at Big Break in the western Delta. Recent repeated observations of adult Chinook salmon have increased interest in this fish barrier. DFG Surveys by Darrell Slotten in 1995-1997 and by Erica Cleugh in 2002 found juvenile (60-80 mm) Chinook rearing in lower marsh Creek.

Modification or removal of the drop-structure will open up 4 miles of Marsh Creek, of which approximately 3 miles have shaded riparian vegetation and suitable spawning gravel.

Marsh Creek Dam is about 7 miles upstream of the drop-structure and is a complete barrier to anadromous fish migration. Immediately downstream of the dam a riparian corridor extends for about 3 miles along Marsh Creek. A reconnaissance survey indicates that this area has suitable spawning gravel for Chinook salmon. This area does not appear to have any over-summering habitat available for steelhead.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Marsh Creek drop-structure		5	40	Concrete drop-structure	None	Maybe under extreme high flows

The Natural Heritage Institute, in partnership with the Delta Science Center and DWR's Fish Passage Improvement Program, is in the preliminary stages of developing a set of alternative designs for modifying or removing the lower Marsh Creek drop-structure. American Rivers/NOAA provided $6,000 to NHI for this work. These designs will be specifically created for incorporation into corridor restoration plans being developed by NHI and the city of Brentwood.

In addition, CALFED has awarded $120,000 to NHI for a watershed assessment, water quality monitoring program, and identification of potential restoration projects. The California Coastal Conservancy awarded NHI $30,000 for design of a creek corridor protection plan in Brentwood. CALFED funding is pending for 2.9 million dollars for tidal marsh restoration at the mouth of Marsh Creek, water quality monitoring, public outreach and education and restoration of three sites along Marsh Creek in Brentwood.

For more information, contact:

- Chris Lee, DWR, Fish Passage Improvement Program (916) 651-9623.
  E-mail: chrislee@water.ca.gov

- Rich Walking, Natural Heritage Institute (510) 644-2900 ext. 109. E-mail: rpw@n-h-i.org
- Erica Cleugh, DFG. (831) 649-7155. E-mail: ecleugh@dfg.ca.gov.

San Francisquito Creek – San Mateo County

The California Department of Fish and Game considers the 45-square-mile San Francisquito Creek watershed to be the best remaining steelhead fishery in the South San Francisco Bay. Searsville Dam and a golf cart crossing, both owned by Stanford University, block access to upstream reaches, but resident rainbow trout flourish above them. Today, less than half the former spawning waters are available to steelhead and these waters are degraded.

Structure Name	RM	Height (ft.)	Width (ft.)	Description	Fish Passage Facility	Passage?
Stanford golf course crossing	7.3			42-inch iron and 24-inch asbestos cement pipe culvert under a road	None	No
Bear Gulch Diversion Dam		10			None	No
Searsville Dam	12.2	68	260	Concrete block	None	No

Stanford University owns the 68-foot-high dam that was built in 1892. It is on San Francisquito Creek in the Jasper Ridge Biological Preserve. The creek supports one of the last runs of wild steelhead in the southern San Francisco Bay Area. Searsville Dam blocks the migratory steelhead from reaching abundant aquatic habitat found upstream in several headwater streams including Corte Madera Creek, one of San Francisquito Creek's largest tributaries. The amount of critical spawning and rearing habitat available to steelhead would substantially increase with the removal of Searsville Dam.

The present level of sediment deposition Searsville Lake is approximately 12 feet below the elevation of the Searsville Dam spillway. Accumulation of an estimated 900,000 to 1.6 million cubic yards of sediment behind the dam has reduced the water storage capacity of the reservoir by about 90 percent. Stanford officials estimate the reservoir may completely fill with sediment in the next 20 years if nothing is done. The dam is an obsolete water diversion source and provides no electricity or flood control. Continued accumulation of sediment within the reservoir is causing serious flooding problems upstream.

Many of those in the watershed, including Stanford University, agree that removing Searsville Dam should be considered. However, there are questions about how it could be removed and the effects on the watershed. Stanford funded the Searsville Lake Sediment Impact Study — completed in 2001 — to determine how the addition of instream sediment will affect the lower watershed when the reservoir completely fills or is modified.

Matt Stoecker

Searsville Dam

The San Francisquito Creek Steelhead Technical Task Force formed to help implement projects to improve habitat conditions for the creek's steelhead. It is working with the San Francisquito Creek CRMP Steering Committee, a well-established watershed group formed in 1993. The Joint Powers Authority, the legal entity governing a major portion of the creek with Stanford University, USGS, and the CRMP serving as advisory members, has acknowledged that the removal of Searsville Dam is an option worth investigating. In addition, the California Water Service Co. – owners of the Bear Gulch water diversion further upstream on Bear Gulch – is considering options for improvements at their dam in the near future. For more information, contact:

- Chris Wilkinson, DWR, (916) 651-9629. E-mail: cdw@water.ca.gov.
- Erika Cleugh, DFG. (831) 649-7153. E-mail: ecleugh@dfg.ca.gov
- Phil Chang, San Francisquito Creek Steelhead Technical Task Force. (650) 962-9867 ext. 304. E-mail: philc@acterra.org.
- Jim Johnson, Streamkeeper, San Francisquito Creek Coordinated Resource Management and Planning program, Peninsula Conservation Center, 3921 East Bayshore Road, Palo Alto, CA, 94303.

San Lorenzo Creek - Alameda County

Stream habitat throughout the San Lorenzo Creek watershed supports native fish populations, and San Lorenzo Creek had highly productive steelhead runs up until the 1950s. The ACFC & WCD reports that there have been numerous reports of adult steelhead and rainbow trout being caught by local anglers or observed in San Lorenzo Creek during wet years from the 1970s to the present.

ACPWA

Don Castro Spillway on Palomares Creek

The majority of suitable habitat is now isolated above dams and flood control projects that have created potential impediments to fish passage, and have led to fragmentation and isolation of aquatic habitats. San Lorenzo Creek has been highly modified downstream of Foothill Boulevard and does not support fish communities for most of its length. Palomares and Cull Creek, tributaries to San Lorenzo Creek, are not accessible to anadromous steelhead due to the presence of Don Castro Dam, completed in 1965, and Cull Canyon Dam, completed in 1962. Both of these dams are impediments to fish migration, and both reservoirs provide habitat for introduced warm water species, such as bass, that prey on juvenile salmonids. Relatively cool water exists above Cull Canyon and Don Castro Dams, but high temperatures due to thermal loading exist downstream of both Cull Canyon Reservoir and Don Castro Reservoir.

Structure Name	RM	Height (ft.)	Width (ft.)	Description	Fish Passage Facility	Passage?
Don Castro Dam				Dam	None	No
Cull Canyon Dam				Dam	None	No

Both reservoirs are nearly filled with sediment. Upstream land use practices and highly erodable terrain contribute to the severe sediment accumulation problem at the reservoirs. In a pilot dredging in 2000, 11,300 cubic yards of sediment was removed from the delta area of Cull Canyon Reservoir. The current average annual sediment inflow is 13,600 cubic yards. At Don Castro Reservoir, 15,800 cubic yards of sediment from the delta area in a similar pilot test in 2000. The current average annual sediment inflow is 8,600 cubic yards.

ACPWA

Cull Canyon Spillway on Cull Creek

The ACFC and WCD has undertaken an evaluation of sediment management options at the reservoirs as part of assessing the future of the two reservoirs. Management options being assessed range from no action, allowing the reservoir to fill in with sediment, periodic desilting to total removal of the dams. Engineering feasibility studies will be completed in late 2002. Potential concerns being addressed by the project include the desire of homeowners in view of the reservoir to maintain the lakes, how to deal with sediment accumulation, and how to provide fish passage to upstream habitat.

For more information, contact:

- Chris Wilkinson, DWR. (916) 651-9629. E-mail: cdw@water.ca.gov.
- P.E. Baker, County of Alameda Public Works Agency. (510) 670-5776.
- Emmanuel da Costa, Alameda County Flood Control and Water Conservation District. (510) 670-6479. E-mail: mannyd@acpwa.mail.oc.alameda.ca.us.

York Creek – Napa County


DWR

York Dam, downstream face

Two structures on York Creek, Saint Helena Upper Dam (also referred to as York Creek Dam) and a downstream diversion structure, have been identified as impediments to fish passage. York Creek Dam, forming Upper Reservoir on York Creek, is a 50-foot-high earthen dam built around the turn of the century. The dam blocks steelhead from approximately 2 miles of habitat found upstream. Little is known about the history of the dam other than it was originally built to provide a water source for private landowners. The city of St. Helena purchased the dam and maintained it for many years to impound water for release downstream to the diversion structure, which conveys water to Lower Reservoir. Lower Reservoir is still used by the city as a source of irrigation water. Since the city has owned York Creek Dam there have been four silt discharges from the dam into York Creek in 1965, 1973, 1975, and 1992. After the 1992 discharge, the state Department of Fish and Game filed a complaint with the Napa County District Attorney. As a result, the city agreed to a settlement in 1993 that mandated the removal of York Creek Dam. Since 1993, Upper Reservoir has not been used by the city as a water source, but the reservoir has been dredged by the city and it functions as a detention basin.

Structure Name	RM	Height (ft)	Width (ft)	Description	Fish passage facility	Passage?
Diversion structure	2	5		Masonry diversion structure	None	Passable at high flows
York Dam	2.5	50		Earthen dam	None	No

The city of St. Helena has conducted engineering and fishery studies to investigate several issues:

- Whether the creek provides conditions for fish migration below and above the dam
- Whether the topography underlying the dam would act as a barrier to fish migration
- Engineering aspects of using erosion control materials for removal of the dam and sediment

In addition, fish passage issues are being considered at the downstream diversion structure due to the federal listing of central California coastal steelhead as threatened.

Several years ago the city estimated the cost of removing York Creek Dam at $500,000. The state Department of Water Resources (DWR) is assisting the city in engineering aspects and pursuing the environmental documentation to remove York Creek Dam and modify the downstream diversion structure, respectively. A Memorandum of Agreement (MOA) between the city and DWR has been developed, outlining DWR's role in providing planning, design and permit services to the city for the projects. DWR is coordinating with DFG, the National Marine Fisheries Service (NMFS), the Natural Resources Conservation Service, the U.S. Army Corps of Engineers (USACE), and the U.S. Fish and Wildlife Service (USFWS) on aspects of the projects. Construction of diversion structure modifications will likely occur in 2003. The project to remove York Creek Dam is being considered for funding under the USACE Continuing Authorities Program and, therefore, may be carried out by USACE.

For more information, contact:

- Chris Wilkinson, DWR, (916) 651-9629. E-mail: cdw@water.ca.gov.
- Myke Praul, City of St. Helena. (707) 967-2792. E-mail: mykep@ci.st-helena.ca.us.
- Gene Geary, DFG. (707) 944-5573. E-mail: ggeary@dfg.ca.gov.

Table 4-1. Priority projects of the Fish Passage Improvement Program that meet Level I and Level II criteria

Stream System	Project and/or Structures
Sacramento River Basin	
Butte Creek	*Butte Creek/Butte Sink/Sutter Bypass* • Willow Slough Weir* • Weir 1 • Guisti Weir • Weir 2* • Weir 3 • Weir 5 • Wadsworth Canal Outfall • East-West diversion Weir • Tarke Weir • Drivers Cut Weir • Morton Weir • End Weir • Mile Long Canal • North Weir • Drumheller Slough Outfall • White Mallard Outfall • White Mallard Dam
Clear Creek	• McCormick-Saeltzer Dam Berm
Yuba River	• Daguerre Point Dam • Englebright Dam
Lower Sacramento-Delta Region	
Consumnes River	Consumnes River Salmonid Barrier Improvement Project • Blodgett Dam* • Low-water crossing • Hopland Dam • Granlees Dam
Murphy Creek	• Sparrowk Dam* • Road crossing*
Sacramento River	• Fremont Weir*

Stream System	Project and/or Structures
San Joaquin River Basin	
Calaveras River	• 42 seasonal flashboard diversion dams* • 20 Road Crossings* • Bellota Weir* • Gravel Pit
Merced River	Magneson Pond Isolation Project • Gravel Pit Merced River Salmon Habitat Enhancement Project • Robinson Reach gravel pits*
Stanislaus River	• Oakdale Recreation Area gravel pits*
Tuolumne River	• Dennett Dam*
San Francisco Bay Region	
Alameda Creek	• Three inflatable dams • BART Weir • Road crossing • PG&E gas pipeline • Niles Dam* • Sunol Dam* • Gaging station apron • East Bay Regional Park swim dams*
Los Trancos Creek	• Los Trancos/Agosti Dam* • 2 culverts*
Marsh Creek	• Drop structure*
San Francisquito Creek	• Golf cart crossing • Searsville Dam • Bear Gulch Diversion Dam
San Lorenzo Creek	• Cull Canyon Dam* • Don Castro Dam*
York Creek (tributary to Napa River)	• York Dam* • Diversion Dam*

* indicates project receiving support from FPIP

Table 4-2. Fish Passage Projects of Other DWR Divisions or Districts.

Stream System	Project and/or Structures	DWR Division/District
Sacramento River Basin		
Battle Creek and tributaries	Battle Creek Salmon and Steelhead Restoration Project • Coleman Diversion Dam • Wildcat Dam • South Diversion Dam • Lower Ripley Creek Diversion Dam • Soap Creek Diversion Dam • Eagle Canyon Diversion Dam • North Battle Creek Feeder Diversion Dam • Inskip Diversion Dam	Northern District
Big Chico Creek	• Iron Canyon fish ladder • Bear Hole	Northern District
Mill Creek	• Clough Dam	Northern District
Yuba River	• Hallwood-Cordura Diversion Screen	Central District
Lower Sacramento-Delta Region		
Putah Creek	Lower Putah Creek Anadromous Fish Passage Improvement Program • Yolo Bypass seasonal check dam • Road culverts • Remains of dam near Winters • Putah Diversion Dam	Division of Environmental Services
Yolo Bypass Toe Drain	• Fremont Weir • Lisbon Weir	Division of Environmental Services
San Joaquin River Basin		
Carmel River	• San Clemente Dam	
Merced River	Merced River Salmon Habitat Enhancement Project • Ratzlaff and Stone Reaches	San Joaquin District

Figure 45

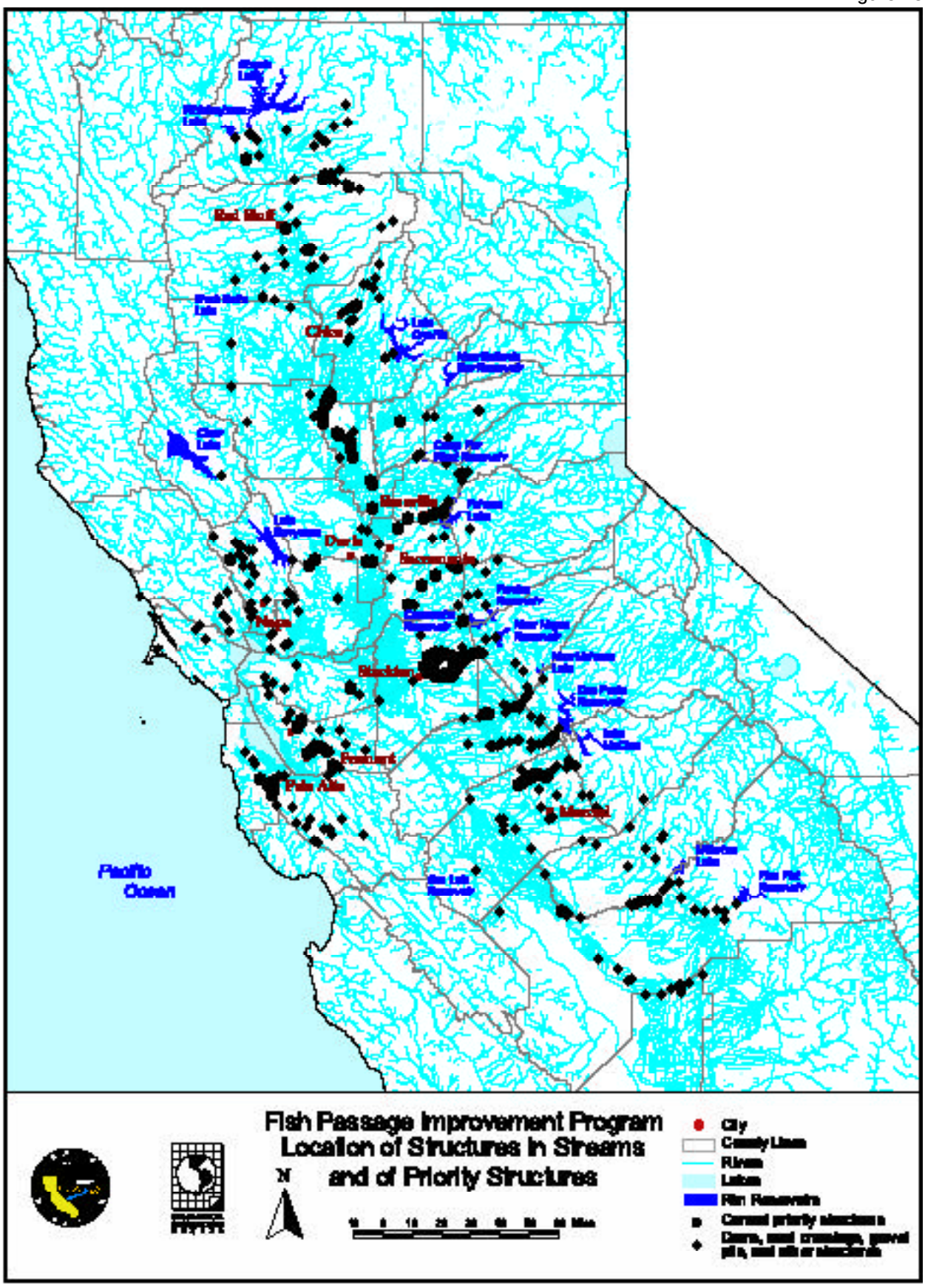

Red Bluff
Chico
Oroville
Pacific Ocean
Fish Passage Improvement Program
Location of Structures in Streams
and of Priority Structures
N
City
Rivers
Lakes
Fish Passage Improvement Program

Figure 46

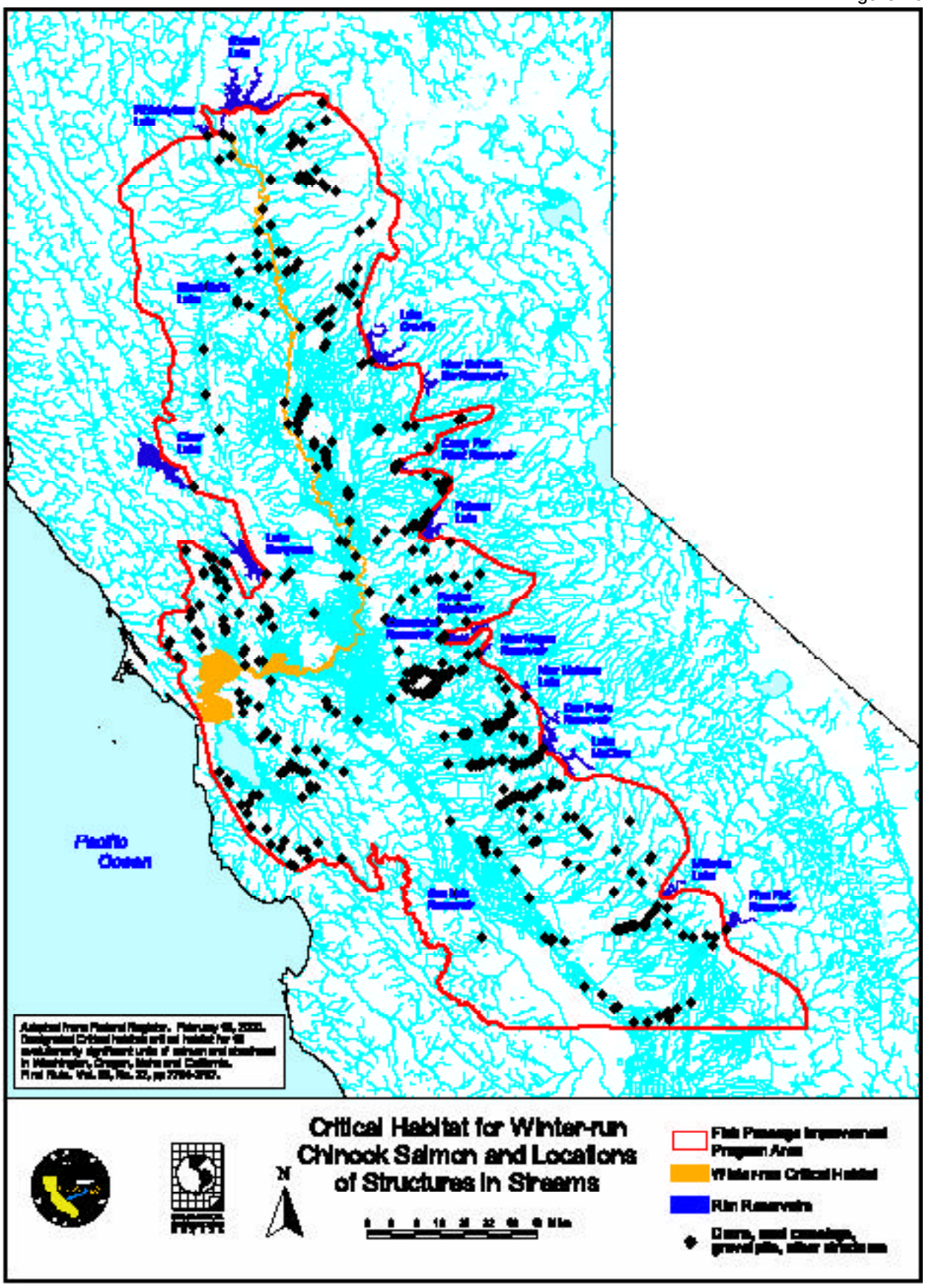

Pacific Ocean
Critical Habitat for Winter-run Chinook Salmon and Locations of Structures in Streams
N
Fish Passage Improvement Program Area
Winter-run Critical Habitat
Dam Reservoirs
Dams, weir crossings, gravel pits, other structures

Figure 47

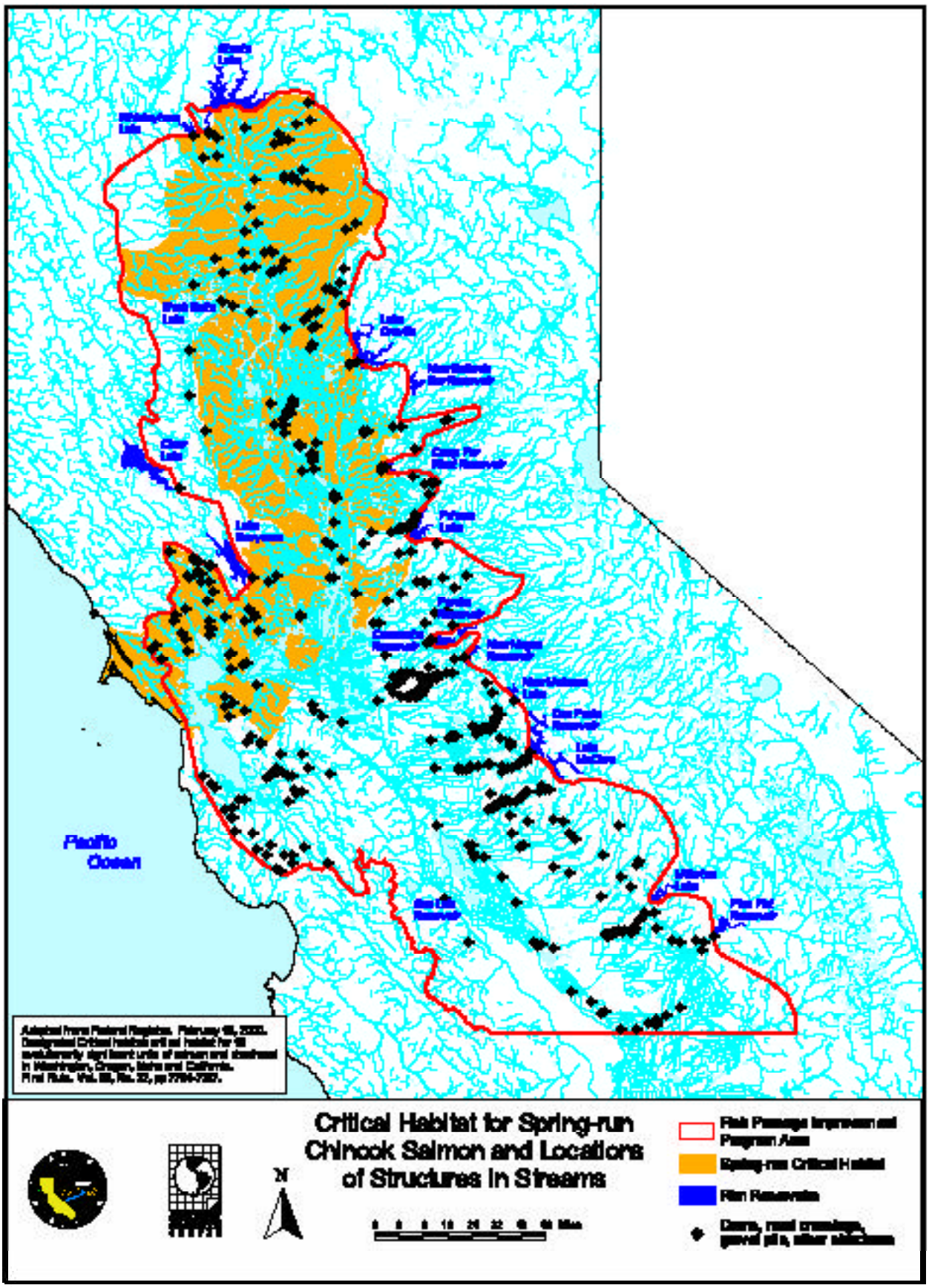

Pacific Ocean
Critical Habitat for Spring-run Chinook Salmon and Locations of Structures in Streams
N

Figure 48

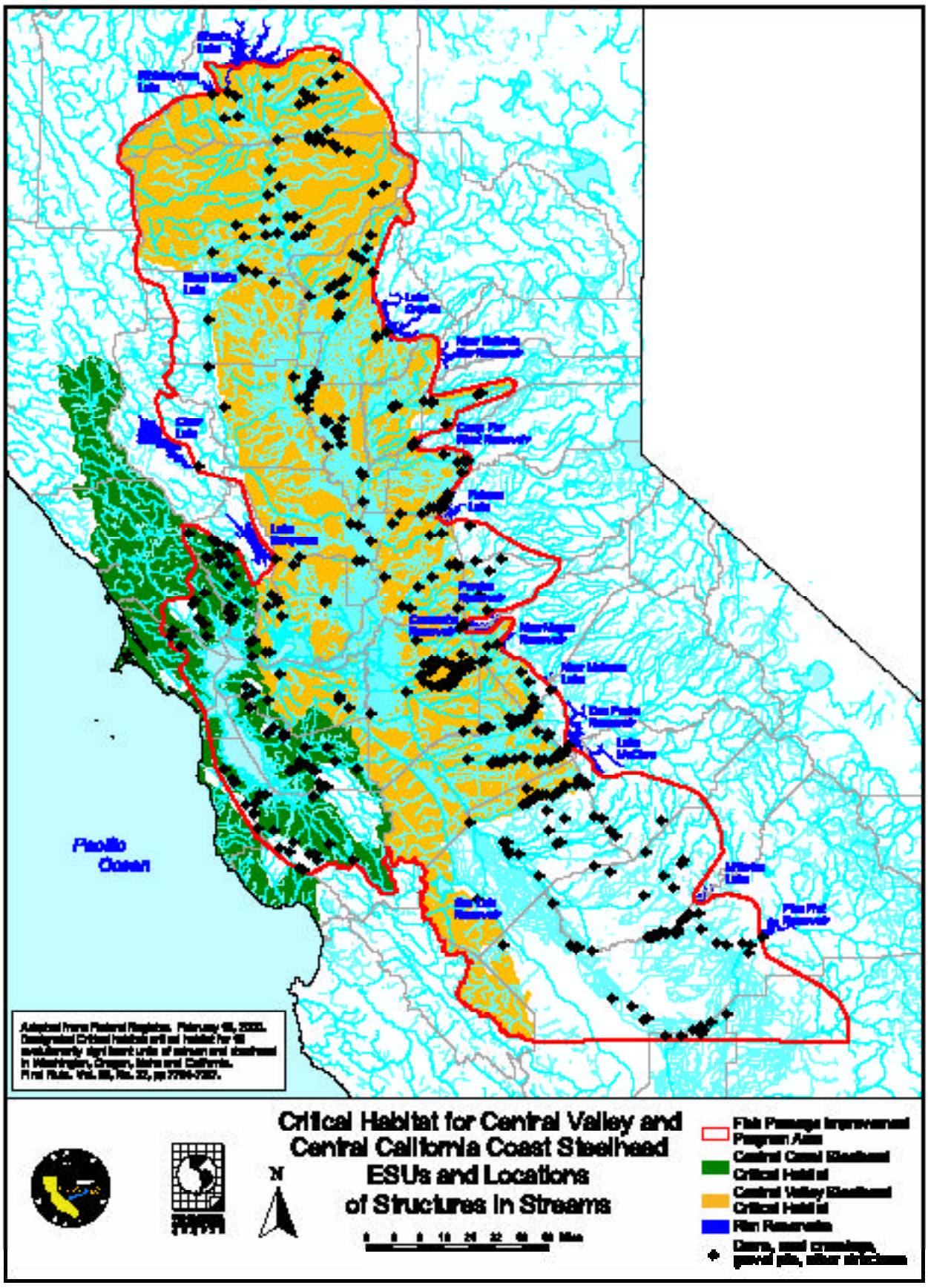

Pacific Ocean
Critical Habitat for Central Valley and Central California Coast Steelhead ESUs and Locations of Structures in Streams
N
Fish Passage Improvement Program Area
Central Coast Steelhead Critical Habitat
Central Valley Steelhead Critical Habitat
Dam Reservoirs
Dams, weir crossings, gravel pits, other structures

Figure 49

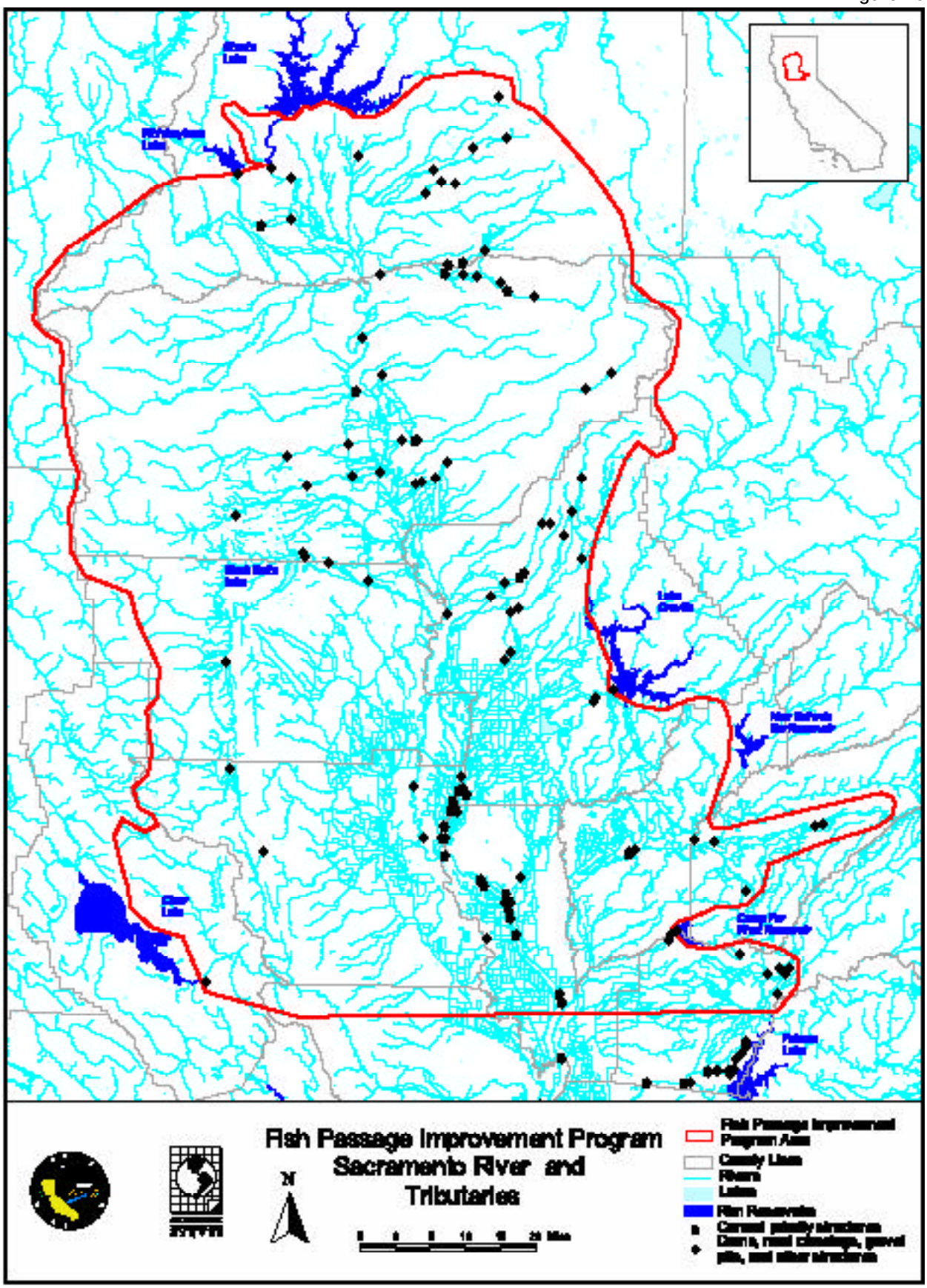

Fish Passage Improvement Program
Sacramento River and
Tributaries
N
Fish Passage Improvement Program Area
County Lines
Rivers
Lakes
Dam Reservoirs

Figure 50

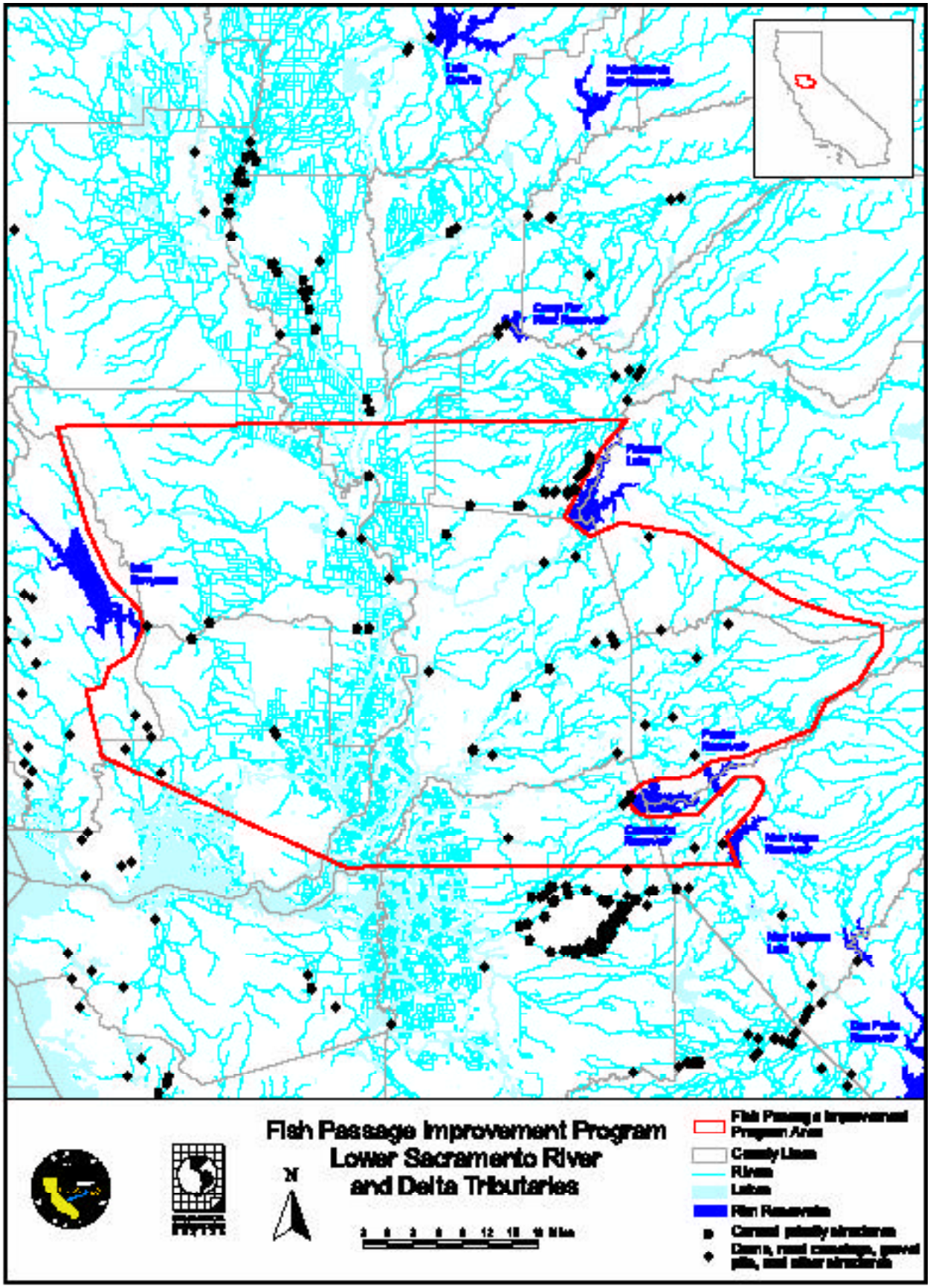

Fish Passage Improvement Program
Lower Sacramento River
and Delta Tributaries
N
Fish Passage Improvement Program Area
County Lines
Rivers
Lakes
Dam Reservoirs
Canal gravity structures
Dams, road crossings, gravel pits, and other structures

Figure 51

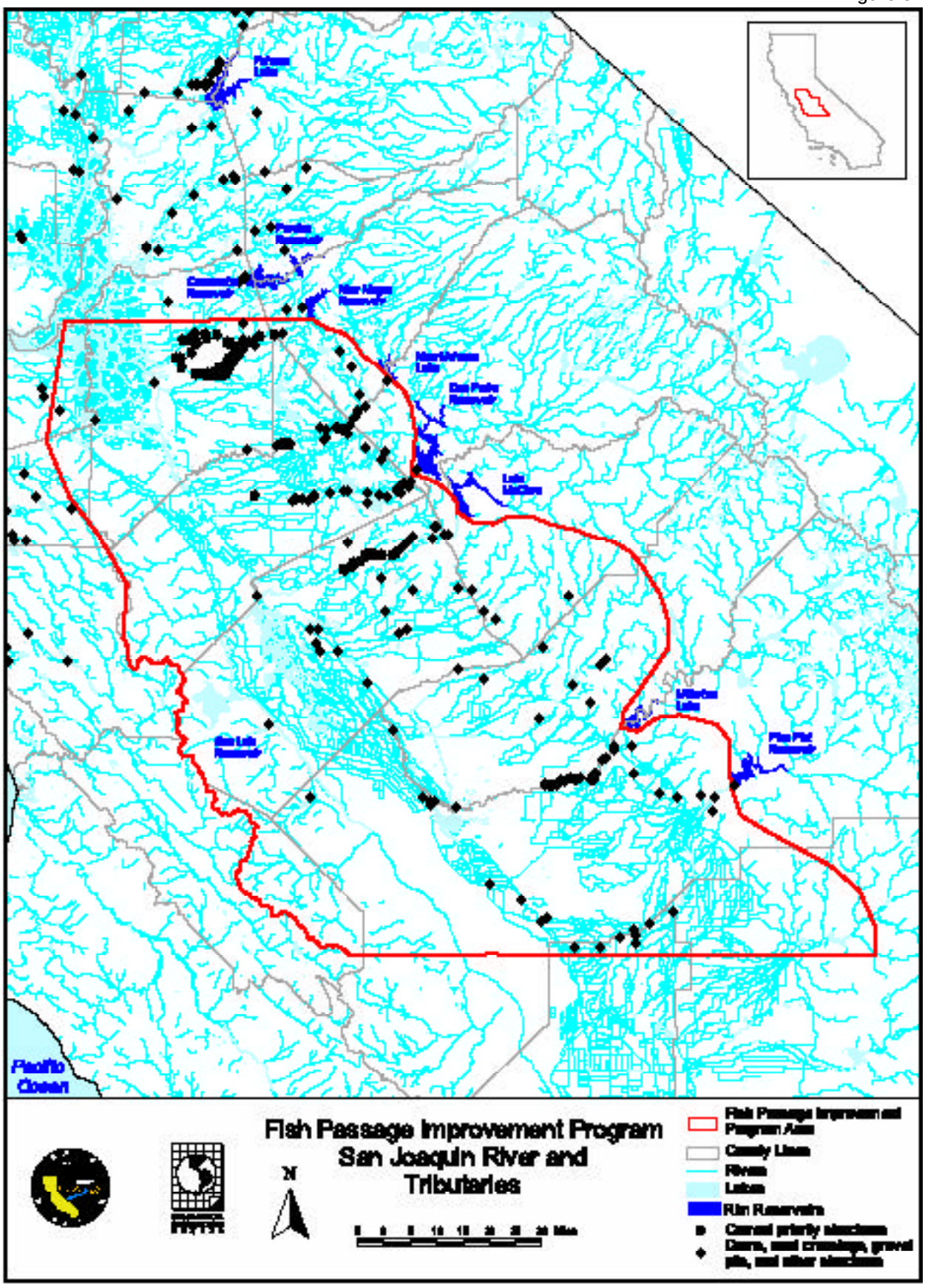
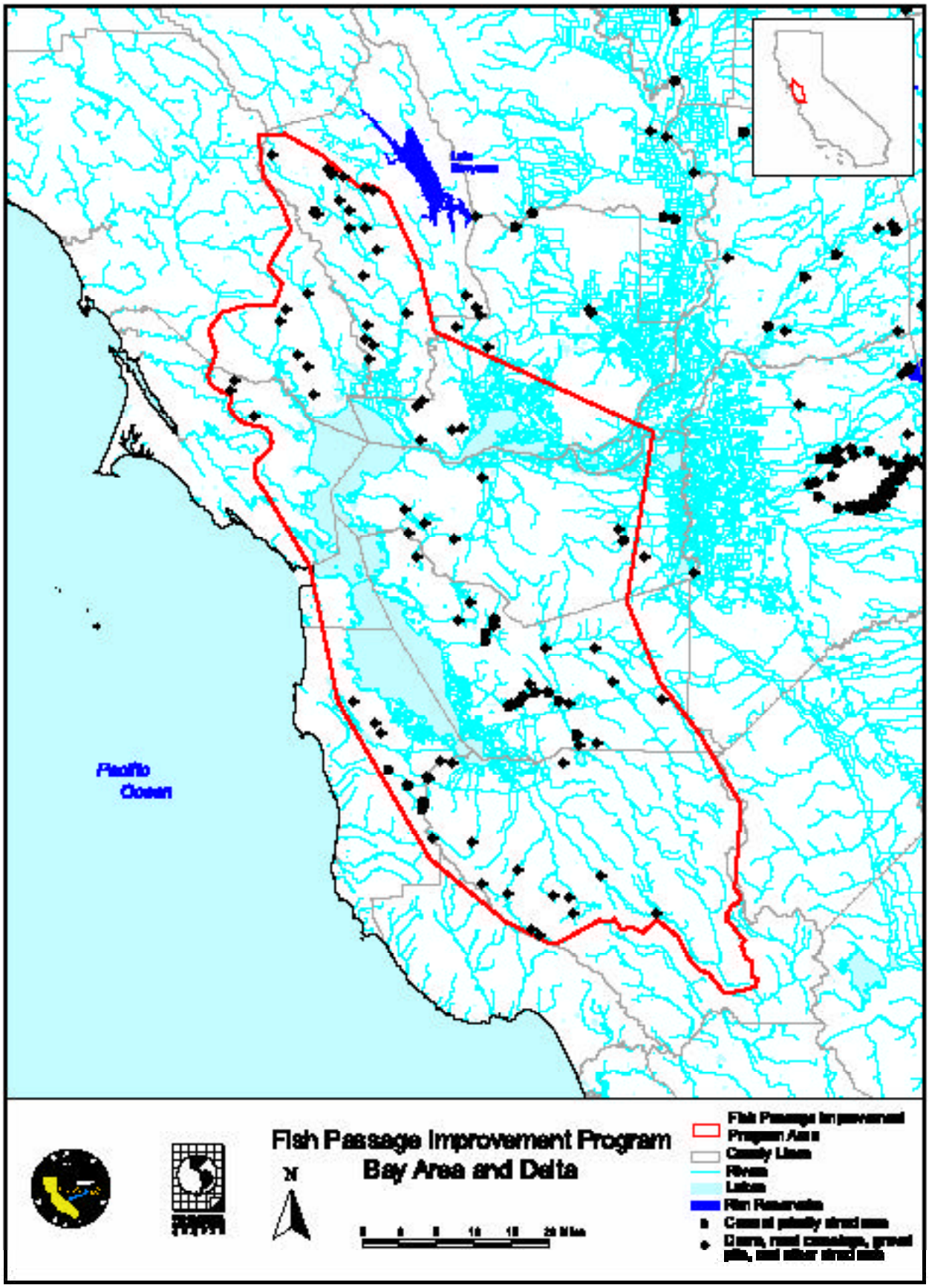

Pacific Ocean
Fish Passage Improvement Program
San Joaquin River and Tributaries
N
Fish Passage Improvement Program Area
County Lines
Rivers
Lakes
Rim Reservoirs
Barrier priority stockton
Dams, weir crossings, gravel pits, and other stockton

Figure 52


Pacific
Ocean
Fish Passage Improvement Program
Bay Area and Delta
N
Fish Passage Improvement
Program Area
County Lines
Rivers
Lakes
Main Reservoirs

Other Chapters